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Find the Distinction

THE shock treatment of the Russian ruble continues to intrigue us. Without public debate or prior notice, the government confiscated nine-tenths of all cash holdings, repudiated two-thirds of its bonds, and seized about half of all the larger savings accounts.

The incident, of course, demonstrates that the perfect society of the Communists is not immune to crisis and that the iron curtain as a barrier to information becomes at times distinctly porous. The incident also shows that in the Soviet the control of information which should be absolutely inviolable until generally released is something less than perfect. For weeks prior to the announcement, there was a run on markets and a frantic effort on the part of ruble holders to exchange them for something more tangible. Or were these leaks deliberate and designed to favor the lodge members in good standing?

This drastic solution for inflation has another angle which leaves us with little room for smugness. An official of the Federal Reserve Board was quoted as saying that no such severely confiscatory measures had ever been found necessary in a capitalist society. We wonder if this is correct.

The rubles accumulated by the unlucky Russians were the unspent portions of past income. Certainly no significant fraction of these cash assets could have been inherited. They represented by and large the excess over expenditure of all the conspicuously able citizens—the industrious peasant struggling with his two-acre private plot whose produce he had been left free to sell in the open market; the writer, the highest-paid worker in the land; the artist; the actor; the engineer; the plant manager. These were the individuals who earned surplus incomes in services outside the authoritarian functions of the Communist bureaucracy.

If we regard the "currency reform" as a single-shot income tax levied upon the top group in Soviet society, it assumes at once a different character. Russia has no progressive income tax. In fact the rate of the tax diminishes as income rises. The government relies to the extent of more than four-fifths of its revenue on sales taxes—a fact which our neo-liberals never mention. Tax technicians refer to this as a regressive tax far more inequitable than the proportional income tax for which some unregenerate conservatives in this country are plugging.

If we bear in mind that the seizure of cash assets in Russia falls most heavily on a small fraction—the men and women with the greatest ability, on those who have sought to save something out of today's earnings for a possible rainy day tomorrow, the "currency reform" in the Red paradise looks astonishingly like our own income tax. For some years we have been exacting regularly nine-tenths of the earnings of our top bracket money makers. In circles on the left, this passes as an authentic manifestation of the liberal spirit. It is a measure of the social justice achieved by an advanced society. It marks an approximation of that "more equitable distribution of income" to which the enlightened aspire.

Yet what is the difference between a ninety per cent tax on personal income and the arbitrary seizure of a similar portion of a man's accumulated assets? Could it be that both represent an unconscionable exploitation of the able individual by the state?

Joseph Stagg Lawrence

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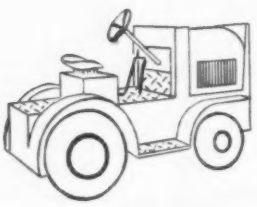

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► Certain gun and shell plants in the middle west have been given new contracts and are resuming production, under military supervision in some cases, and company supervision in others.

► Air Force is conducting research into use of stainless steel rotor blades for helicopters. Preliminary results indicate this type to be superior in performance, structural suitability, and all weather usage than the fabric covered wooden blades.

► Strategy of non-complying unions in their battle against the Taft-Hartley Act will probably follow one of two courses: (1) A boycott of NLRB. (2) A host of individual charges of unfair labor practices in lieu of each rejected union charge. During 1948 NLRB machinery will either have less grist to grind, or it will clog as a result of an unprecedented load of litigation.

► Metal for metal replacement in domestic markets, constantly in progress, is now at peak potential. Further increasing use of substitute metals may be expected in 1948 when new aluminum finishing capacity comes into operation, provided that there is greater rainfall on this continent than in the past year.

► A survey of chief accounting executives of metalworking plants showed that 97 pct favored liberalization of depreciation methods for depreciable assets. More than 70 pct indicated that present procedures do not provide adequate reserves for facility replacement.

The attitude of the U. S. Treasury Dept. on liberalization of depreciation has curbed Congressional action. Treasury says the immediate loss of revenue would be serious.

► An electrolytic technique for producing cobalt powder of 99.99 purity has been revealed. It is anticipated that this material will find use in magnetic alloys and low coefficient of expansion alloys.

► Interest is growing in the potentiality of "ceremals" for high temperature service, both industrial and military. Although this ceramic-metal program is still very much in the embryo stage of development, considerable fundamental research is under way in this country. A variety of methods for producing ceremal products are possible and all are being investigated.

► A subsidy program of some kind to encourage domestic production is in the cards for 1948. Despite the President's veto of the premium payment extension bill, administration support for a wiser minerals conservation measure can be forecast.

► War Assets Administration will soon offer 3000 gross tons of rails at the Dixon, Ill., Green River Ordnance plant. The rails will be sold as is and must be torn up and hauled out by the buyer. Other large government railroad installations will soon be scrapped in the midwest.

► Lengths, diameters, and other variables of home plumbing pipe may be due for changes as a result of tests now being conducted by the Bureau of Standards. The bureau has erected a series of typical home plumbing circuits--all employing transparent plastic. Movies of the tests are expected to be made available soon.

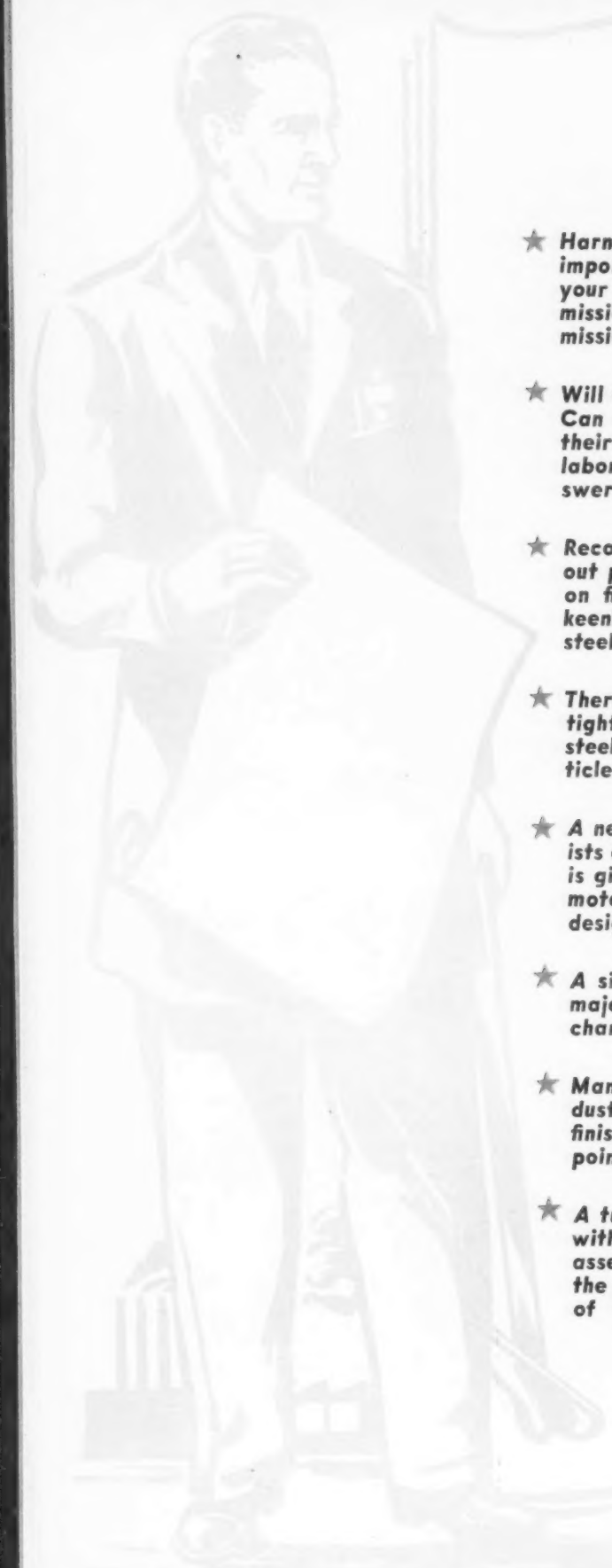
► The alloy price picture is so complicated that district offices are often unable to figure the new extras. Some weeks are expected to pass before the confusion is cleared up.

► British steel prices are going up approximately $1 per ton immediately due to a recent 50¢ per ton coal price increase. Most of the postwar steel price increases in the United Kingdom have been attributed to coal price increases.

► An auto firm which is using hot extrusion rather than orthodox forging methods to produce front wheel spindles finds that the new spindles are 50 pct stronger in fatigue than forged spindles. There is also a substantial saving in machining costs, it is reported.

► Although the present integrated auto body-frame construction is not suitable for convertibles or station wagons, it is reported that a satisfactory design has already been worked out. All Nash cars and probably all Hudsons will be frameless in 1948.

► The slew of scrap which Bethlehem hopes will add up to a million tons over the next few years and which is to come from China may not be that big. Scrap circles buzz with the idea that a million tons represents the maximum hoped for--it may turn out to be half that or even less after all the non-scrap is squeezed out.



In This

★ *Harnessing atomic energy to peacetime uses may have some important effects upon your plant and equipment, and upon your markets. The chairman of the US Atomic Energy Commission discusses these subjects and also discloses the commission's new five year program in this article.* **Page 126.**

★ *Will there be another round of steel wage increases in 1948? Can steel prices go higher? What do steel buyers think of their steel mill sources? What are the prospects for enduring labor peace? These and many other timely questions are answered in this forecast of what to expect in 1948.* **Page 130.**

★ *Reconstruction of vital industry in Europe is a slow, drawn-out process, but progress is being made. This article, based on first-hand experience as a foreign reporter, presents a keenly analytical appraisal of the present and future of the steel industry of England and the continent.* **Page 140.**

★ *There's little hope for any real relief in 1948 from the current tightness of steel supplies, according to this report on the steel market written from the consumers' viewpoint. The article gives the what and why of 1948's outlook.* **Page 148.**

★ *A newsy behind-the-scene glimpse at what Detroit's top stylists and production men are planning for the car of the future is given in this exclusive preview of things to come from the motor capital. A full color illustration of the car Detroit's designers expect to see in 1950 is also included.* **Page 156.**

★ *A simple quick method of determining basing points for all major steel products is provided by the handy wall-sized chart which covers 57 steel basing points.* **Page 220.**

★ *Many accomplishments are credited to the metal finishing industry in the past year in perfecting engineered utilitarian finishes. This article highlights these developments and points out likely trends in finishing for 1948.* **Page 184.**

★ *A tug-of-war of gigantic proportions is shaping up for 1948, with union and management doing the tugging and the harassed NLRB acting as referee. How the lines are forming and the possible outcome are weighed in this thoughtful analysis of the labor picture for the coming year.* **Page 178.**

Issue...

★ Is the new industrial giant of the West Coast—primary aluminum capacity—a good or bad feature? This pithy report explains the fears some Westerners feel and it also totes up the good points in this startling expansion which already accounts for 54 pct of the nation's capacity. Page 190.

★ In meeting the swiftly moving demands of new production techniques and new service demands, metallurgical research and development activity in 1948 lead to many significant achievements. These accomplishments, and the trends to look for in 1948, are summarized in this report. Page 198.

★ Vital aid in locating suppliers of materials used in the metalworking trade is this new IRON AGE Buyers' Guide. Designed specifically for the busy plant executive, this guide features product and equipment headings broken down as finely as practicable. This new directory begins on Page 208.

★ Is industry doing anything about shrinking high grade iron ore reserves? Will scrap and coke be plentiful in 1948? This trenchant survey of the raw material picture presents the latest and most authoritative information available on the outlook for 1948 for ore, scrap, coke and coal. Page 210.

★ The latest statistics on prices and production of all major iron and steel products, including iron ore, scrap and coke, and nonferrous products, in tabular form, are on Page 236.

★ Heavy domestic demands and the bullish effect of foreign aid plans forecast higher prices for nonferrous metals this coming year, according to this appraisal of prices and production for the coming year. The dark-horse role of aluminum which could result in a counter-trend movement, is discussed. Page 228.

★ More than 95 pct of industrial executives believe that industry needs more liberal depreciation rates if it is to maintain modern production facilities and to continue to play its role in national defense, according to the nation wide poll of industry discussed in this article. The article also sums up the pertinent factors in the case for liberalized depreciation. Page 168.

★ The regular weekly news and market reports of the metalworking industry, including scrap markets, machine tool markets, personals and nonferrous news begin on page 240. The weekly summary and ingot rate are on Page 256.

The ATOM

• What does atomic energy mean to the average business? Will it create new markets? Will it render obsolete present industrial equipment? How far away is the harnessing of nuclear energy for industrial purposes? These and other pertinent questions concerning the future of the atom and industry are authoritatively discussed by the chairman of the Atomic Energy Commission. Plans of the commission for the development of nuclear energy over the next 5 years are told.

and industry

By DAVID E. LILIENTHAL
Chairman,
U. S. Atomic Energy Commission

WHAT effect will atomic energy have on my business? Will it open new markets for my products? Will it make obsolete overnight my plant, my product and my present power system? Will atomic energy development gobble up such short supply materials as steel, lumber, nails and bolts?

Every day the U. S. Atomic Energy Commission receives questions such as these from industrialists and business men from all over the country. One correspondent recently asked for the latest information on atomic laundry machines, explaining that he was about to install new equipment and was fearful that it would be obsolete in a short time. Investment houses, underwriters and banks want to know if this new source of energy will so change the economics of power supply as to make investments in the securities of the present public utilities corporations, for example, a bad risk. They ask, too, whether the present period allowed for amortization of new power-producing and general industrial facilities is too long since "back-fence" authorities have it that atomic energy is going to revolutionize everything from automobiles to zithers.

Now American industry has a right to expect answers to such questions. Indeed, since one of America's most valuable assets and bulwark of defense is its great industrial potential, the government would be derelict in its fundamental duty if such information were not supplied industry. Of course, there are and will continue to be fields of information which must be held secret, for atomic energy is double-edged: It can wreak greater destruction than any weapon ever before devised; or it can confer upon mankind vast benefits.

To keep industry informed and to widen industrial participation in this vital new development we have recently enlisted the assistance of an outstanding group of men comprising an advisory group on industrial participation. They are now examining virtually the entire atomic energy undertaking, and will point out to us the ways whereby broader industrial and engineering participation may be encouraged. This group is headed by the president of the Detroit Edison Co., James W. Parker, and includes among its members such well-known engineers and industrialists as Oliver E. Buckley, president of Bell Telephone Laboratories; Robert E. Wilson, chairman of the board, Standard Oil of Indiana; Isaac Harter, executive vice-president, Babcock & Wilcox Tube Co.; Donald Carpenter, vice-president, Remington Arms; Bruce K. Brown, president, Pan American Petroleum&Transport Corp.; Gustav Egloff, director of research, Universal Oil Products; Paul Foote, executive vice-president, Gulf Research & Development Co.; G. O. Wessenauer, manager of power, TVA; and Jerome C. Hunsaker, chairman, National Advisory Committee for Aeronautics. So that they may work effectively, the Commission has taken the unusual but necessary step of giving the members of this group access to restricted data and an inside look at the problems that face the Commission. The readers of THE IRON AGE will of course receive full reports of their public findings and suggestions. Until that time I shall try briefly to report here some of the facts that most directly interest and concern industrial executives.

As to the possibilities of atomic power, our best estimates can be quite simply stated:

(1) Atomic power is not just around the corner, not just around two corners.

(2) A major effort will be required, and it is being undertaken, to accomplish development of atomic power. The Knolls Atomic Power Laboratory being constructed at Schenectady, to be operated by General Electric, is part of this effort.

(3) We are clear that ultimately atomic power will substantially contribute to the national power requirements.

DAVID E. LILIENTHAL, chairman, U.S. Atomic Energy Commission.

To put this atomic energy picture into perspective, let me outline the scope of the program today and foreshadow in general terms what we now think will be required in the next, say, 5 years to maintain American pre-eminence.

As a preface, let me backtrack to 1939. Then scientists found that when an atom of uranium was bombarded by neutrons, it sometimes split (fissioned) with a release of energy, which in comparison with the size of the atom, was tremendous. Later in 1939, it was determined that each atom that split released, besides energy, some additional neutrons which were then available to cause fission in still other uranium atoms, and so on, causing a chain reaction. Now uranium to all intents and purposes has two normally occurring types of atoms or isotopes, U-235 and U-238. The latter is 139 times more prevalent than the U-235. It was soon discovered that the reason not all uranium atoms fissioned was that only the U-235 atoms were capable of this phenomenon. The problem of using the energy of fission for a weapon or for power at first appeared to be a problem of separating the U-235 from the U-238.

However, other scientists had been studying the U-238 atom. While it did not seem to be capable of fission, nuclear calculations indicated that if it could be made to absorb a neutron it would, through emissions of particles, become what should be an entirely new element, later named plutonium and which itself should be fissionable like the U-235.

During World War II, first the Office of Scientific Research & Development and later the Army's Manhattan District spent $2 billion trying to obtain enough U-235 or plutonium to make an atomic weapon. This venture we all know was magnificently successful and the atomic bomb was employed first against the enemy at Hiroshima and three days later at Nagasaki with devastating results.

Production of U-235 was the object of the great installations at Oak Ridge, Tenn., the vast gaseous diffusion plant, the thermal diffusion plant and the electromagnetic plant.

Plutonium was the end-product of the 600-sq mile works at Hanford, in eastern Washington, designed and built by du Pont. Here great atomic piles, wherein U-238 is caused to absorb a neutron and become plutonium, were built.

During the war no expense was spared, no chance, however slight, was disregarded. Full-scale production plants had to be constructed from little more than ideas. As a consequence, a great number of jerry-built houses, offices and plants were thrown up at practically a moment's notice, with little concern for permanency, or cost.

Across the nation the installations, once secret, sprang up—Oak Ridge, 49,000 acres, a peak population of over 70,000, now 35,000, costing over $1 billion; Hanford, Wash., 600 sq miles, a peak population of over 60,000, now 15,000, costing over $500 million; Los Alamos, N. M., 45,000 acres, a wartime population of 6200, now about 8500, costing over $60 million. Also, laboratories at Chicago, New York, Columbus, Ames, Berkeley, Cambridge and elsewhere. A network of facilities covered the country.

When this Commission took over from the Army on Jan. 1, 1947, under the new McMahon Act, our first task was to scrutinize the entire project, to see what had to be done to assure continued United States pre-eminence in the field. Probably all of you have been noticing in the last year scattered bits of information about what the Commission is planning to design, or construct, or buy, or enlarge.

Over the next 5 years, a major program needs to be carried out. This includes the following:

(1) New facilities for the Argonne National Laboratory in Du Page County, Ill.

(2) Brookhaven National Laboratory, on the site of Camp Upton, Long Island.

(3) A new research laboratory at Miamisburg, Ohio.

(4) Housing, public works, utilities and research facilities including a new high flux pile at Oak Ridge, Tenn.

(5) Research facilities, housing, and the like at Los Alamos, N. M.

(6) Housing, public works, utilities, commercial facilities, schools and production plant modifications and installations at Hanford, Wash.

(7) A new research center for metallurgical studies at Ames, Iowa.

(8) Research facilities at Berkeley, Calif.

(9) Knolls Atomic Power Laboratory at Schenectady.

Should the Commission carry out such a program, it will have to call upon industry to supply the nails, steel, aggregate, fuses, valves, plugs, nuts, bolts, shovels, tractors, lumber, bathtubs, aluminum, copper, asbestos and the hundreds of other things necessary. Here may be markets for myriad kinds and shapes of products; design or building or operating the facilities themselves will call upon many industrial concerns.

Why does the Commission plan this extensive

program of expansion and construction? It is to fulfill the obligation written by Congress in the Atomic Energy Act of 1946, Section 1(a):

"Research and experimentation in the field of nuclear chain reaction have attained the stage at which the release of atomic energy on a large scale is practical. The significance of the atomic bomb for military purposes is evident. The effect of the use of atomic energy for civilian purposes upon the social, economic and political structures of today cannot now be determined. It is a field in which unknown factors are involved. . . . Accordingly, it is hereby declared to be the policy of the people of the United States that, subject at all times to the paramount objective of assuring the common defense and security, the development and utilization of atomic energy shall, so far as practicable, be directed toward improving the public welfare, increasing the standard of living, strengthening free competition, in private enterprise, and promoting world peace."

In Section 1 (b), the Act states:

"It is the purpose of this act to effectuate the policies set out in section 1 (a) by providing, among others, for the following major programs relating to atomic energy:

"(1) A program of assisting and fostering private research and development to encourage maximum scientific progress;

"(2) a program for the control of scientific and technical information which will permit the dissemination of such information to encourage scientific progress, and for the sharing on a reciprocal basis of information concerning the practical industrial application of atomic energy as soon as effective and enforceable safeguards against its use for destructive purposes can be devised;

"(3) a program of federally conducted research and development to assure the government of adequate scientific and technical accomplishments;

"(4) a program for government control of the production, ownership, and use of fissionable material to assure the common defense and security and to insure the broadest possible exploitation of the fields; and,

"(5) a program of administration which will be consistent with the foregoing policies and with international arrangements made by the United States, and which will enable the Congress to be currently informed so as to take further legislative action as may hereafter be appropriate."

As we see it, to comply with the policies and purposes of the Act we must continue and expand the production of fissionable material, both for weapons and for experimentation on possible development of usable power and a multitude of other peacetime uses. We must sponsor and expand research and development of techniques and processes in the interest of expanded production of these fissionable materials. We must concentrate, in short, on keeping America's pre-eminence in atomic energy.

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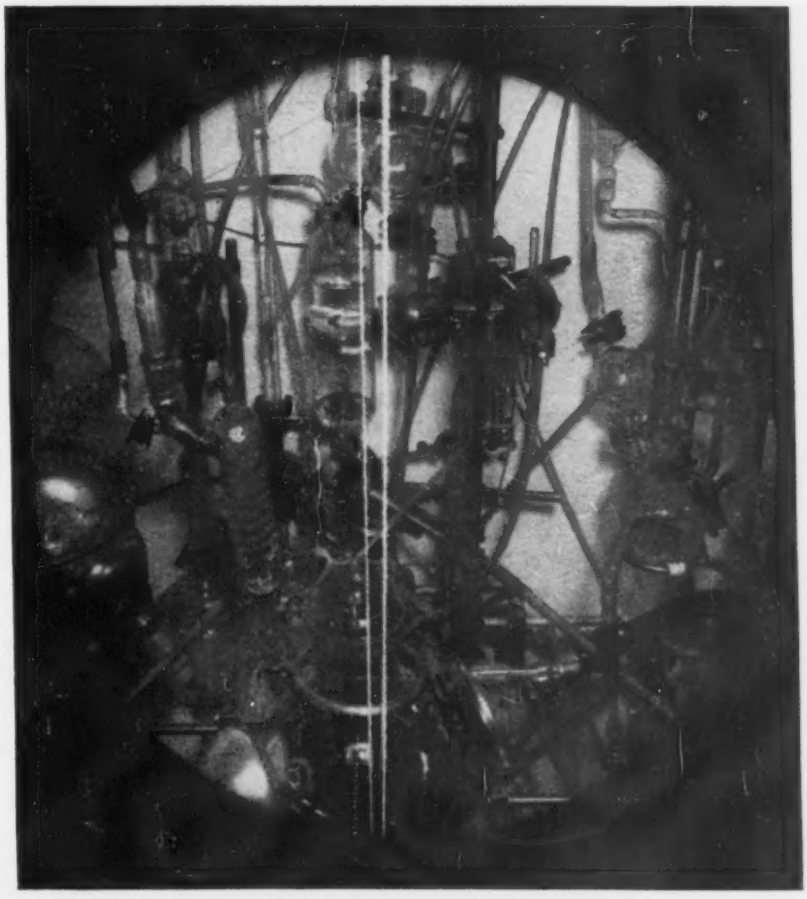

VIEW inside a "hot cell" as seen through a periscope. Radioactive material is processed in these cells, behind thick concrete walls. Operations are performed by manipulation from the outside while the operator observes the action through special periscopes.

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STEEL

By TOM CAMPBELL
News-Markets Editor,
THE IRON AGE

• Producing 85 million tons of ingots in one peacetime year, as the nation's steel plants did in 1947, despite shortages of scrap, pig iron and coke, should entitle the industry to a modicum of bragging. But all is not honey and sweetness. Some steel brass seem to have let their men down; others found themselves in the Alice-in-Wonderland position of explaining why expansion wasn't necessary—as they pushed expansion plans. 1948 will have to be another year of miracles if maximum production is to be achieved in the face of more shortages and more wage increases and more price increases. And public relationships also seem to require some overhauling.

at the Crossroads

THE public squabble between steel leaders and government bureaus over steel capacity has led many people to believe: (1) That the industry is lying down on the job; (2) that the gray market includes most steel sales; and (3) that a big increase in steel capacity would solve everything. There is no real basis for any of these impressions. But part of the responsibility for these widespread beliefs belongs to steel management.

At no time in history has the steel industry lain down less on the job than during 1947. The medal of merit goes to production men, engineers, and the sales force. The brass has not done as well as it could have in its official and public pronouncements. Perhaps the reason is that anything the administration says releases an automatic "no" in the minds of most steel officials.

But most government men have their automatic reflex, too—they think that steel heads do nothing but think up ways to put the administration in the grease. This sideplay which has gone on for years—and which has little or nothing to do with what is really happening in the industry—sometimes does harm.

Last May it appeared from newspaper reports of steel leaders' statements that the steel industry was against expanding. The old studies were brought out, refurbished and presented. The past was cited, the future was looked at through smoked glasses and the industry was pegged, after its May annual meeting, as being opposed to expansion. The industry was accused of trying to keep supplies short in order to make more money; and of contributing to another depression.

Taking the bait, more outbursts from steel brass cemented the idea in the minds of the public that steel had departed from the free enterprise, American way of doing things. They gave credence to a belief that no more expansion was necessary; that we had arrived; that there never would be any demand that the industry could not take care of with present capacity.

Some of the industry's best friends began to feel that the steel leaders were old stick-in-the-muds; that if left alone they would have this country in the same plight as England. Then the industry's "carpers" had a field day with such phrases as "more abundance," more for everyone, a greater national income, etc. All this was unnecessary because industry spokesmen (some say spooksmen) did not mean what they said.

Too late to prevent harm, the industry heads came to the country via a Congressional hearing route with a story that the industry was expanding. It looked as though this was a yarn thought up to offset the unfortunate one booted about last May. It wasn't anything of the sort. Expansion, as usual, had been taking place long before capacity became a national issue.

Steel has always done things to bring more money into the coffers, more customers and better customer relationships (which might mean slicing off a particularly nice portion of its competitors' business). It has always expanded year after year. The record proves it. It is expanding now. It will expand next year. But it won't take any advice as to how much or how little from people who it thinks do not know an ingot from a brassie. But even that is beside the question.

There is no evidence that there is any deterrent to continual expansion in steel except possibly the high cost of buying new equipment. But even that will be overcome when it looks as if some other steel company will take the ball. The contemplated East Coast plant of U.S. Steel is now being held up because the cost of new equipment is far in excess of original estimates. Eventually that will be overcome by competitive conditions.

Along with the paradox of seeing steel leaders try to slug their way out of the May maze is the mistaken notion that all steel men think alike. It isn't so. Privately they hold the same ideas about each other as you have about your neighbor—either the one across from you or the one next door. It took a Congressional hearing to bring out this difference. It should have come out much before then. If it had, the tremendous pressure for allocations, price controls and expansion plans would be far less potent than it is now.

An aroused public, an election-conscious administration and steel consumers who have gotten the short end of the stick have plenty of ammunition to fire away at the industry—re-

gardless of the truth or falsity of the charges. But what are the facts about steel capacity, steel production and the gray market?

(1) Steel capacity is being expanded now. Part of it will be by actual increase in openhearths, part by use of more blown metal from the bessemer, part by use of oxygen, cutting down melting time, and part by superior performance of existing equipment. Most of the remarks made by steel and government officials have little to do with the actual question of capacity. The engineers and workmen are taking care of it. Competitive conditions will add more zest soon to the capacity question. The drop in steel capacity after the war was a realistic elimination of equipment which was held in operation because of the war. It was obsolete with no valid reason to keep it going during peacetime. New capacity from now on will be the kind that will mean more production, faster output and better quality. There is no more reason to take the word of government experts on capacity than there is to believe some of the statements by steel die hards. Somewhere in between is the answer—and that is the direction in which expansion is now heading.

(2) Steel production this year, at about 85 million tons, is the highest in any peacetime year. It is below the all-time high in 1944 but it should not be compared with that year. In wartime there is only one customer—the government. The number of orders, the type, the size and the destinations are far different in peacetime. They are more numerous and varied. On that basis this year's performance is tops in steel mill history. Who did it?—Men who 10 years ago would have raised their hands in holy horror if the same job had been handed them. That is why 10 years from now the same thing will be true. Steelworkers, management included, are the most loyal, hardest working bunch of fellows in any industry. Generations stick to it, bitch about it, make eyes at other jobs, go on strike, cuss the boss and warn their kids away from it—but they stick to steelmaking.

(3) Steel leaders harmed themselves by, at first, closing their eyes to the existence of a gray market in steel. They knew little if anything about it a few years ago—because they were not involved in it. But it existed long before OPA went out and it broadened out as steel became tighter. Rumors had it much larger than it was. It was this fallacious view that steel officials were attacking. But it looked to the public and to steel customers as if they denied that there was a high premium market. Later most steel officials in Washington did agree that a gray market existed and said they were doing everything they could to stamp it out. What they could do was a drop in the bucket.

In peacetime it is no crime to sell what you have for more than you paid. That is what customers did in 1947. It is what many will do next year or until the steel demand picture lets up. A survey by THE IRON AGE showed that about 4.3 pct of the steel being used by consumers was bought in the gray market. Circulating inquiries received by many steel users gave rise to rumors of tonnages far out of line with what actually was bought and paid for at premium prices. But the gray market was serious because its existence furnished the ammunition that the industry was bungling the job of steel distribution.

Gray Market Paradox

First denying that the gray market was a factor, later admitting before Congress that it was a factor, steel leaders finally attempted to stamp it out as far as their products were concerned. Again the lag in clear-cut acknowledgment meant a lot of twiddle and twaddle that was unnecessary. IRON AGE men searching diligently for more than a year have found no evidence that steel producers were involved in or countenanced gray market activity. There are a few companies well known for their premium priced ingots but this is no mystery.

One would think that with capacity troubles, irate customers, gray market charges, tight steel, high prices and the administration on its neck, the steel industry would be thoroughly hated by most of its customers. But it isn't. The great majority of steel customers think the steel industry is doing a good job. They said so—more than 84 pct of them—according to an IRON AGE survey.

When it came to asking consumers whether their relations with steel companies were "bad," only 5 pct agreed that they were. And about 10.6 pct said that their relations with steel companies were "indifferent," which certainly isn't bad when they had a chance to check off the worst they could. This is one of the best criteria in the world to tell what kind of an impression the steel industry is making. If its customers don't know, then no one does.

Consumers Fairminded

It might be expected that those who had a "mad on" at the steel industry would take a healthy swipe at it. But they didn't. When they were asked in November whether they would change their source of supply when things were better, 74 pct said nope they didn't think so. About 8 pct were mad enough to say they would and almost broke their pen or pencil answering this part. On the fence were 18 pct, and if the sales departments of steel companies know what they are doing (and a lot of them must, judging from survey returns), they will go after that doubtful group.

Last March steel consumers were asked if they expected to change their source of supply when conditions were better. Then, 63 pct said "no" and 19 pct said "yes" while 17½ pct were on the fence. Instead of losing ground steel firms (not all of them) are gaining friends at a time when the going for the customer is tough. It is all the more remarkable to find this state of affairs when some steel firms are throw-

RETURN ENGAGEMENT? Most of the men around the table have been to Washington many times. In 1939 it was for too much capacity. In 1947 it was for too little. Maybe in a few years it will be for something else. But some day they will stand or fall on their 1947 position. Left to right around the table are: Benjamin F. Fairless, president, U. S. Steel; Eugene G. Grace, chairman, Bethlehem Steel Corp.; George R. Fink, president, National Steel Corp.; Frank Purnell, president, Youngstown Sheet & Tube Co.; Admiral Ben Moreell, president, Jones & Laughlin Corp.; Tom M. Girdler, chairman, Republic Steel Corp.; Hiland G. Batcheller, president, Allegheny Ludlum Steel Corp.; Newell H. Orr, vice-president in charge of sales, Colorado Fuel & Iron Corp.; Wilfred Sykes, president, Inland Steel Co.; Henry A. Roemer, chairman and president, Sharon Steel Corp.; W. W. Sebald, executive vice-president, American Rolling Mill Co.; Archie J. McFarland, president, Wheeling Steel Corp.; J. L. Neudoerfer, vice-president in charge of sales, Wheeling Steel Corp.

ing overboard customers they have had for 10 or more years—some as long as 30.

One might think that those steel users with the smallest inventories would rip the paper apart showing their feeling against steel companies. But nothing of the sort happened. There was no relationship between those who said they had inventories below normal and those who said their relations with steel firms were at the bottom of the pit.

There was a lot of talk in the fall of 1946 about the coming recession, depression, correction—you take your pick. There has been little or no talk about it in recent weeks. Steel leaders who a year ago felt that demand and supply would be in balance by July 1947 now think that maybe it might be that way in October 1949. The sustained demand for steel has so puzzled all the experts and nonexperts that predictions are so wrapped up with outs that they aren't worth a damn. No one knows. Things are a little different now than they have been in the lives of most living steel men.

Without any elaborate whatsis or gimmick THE IRON AGE asked steel consumers to tell them whether their inventories were above normal, below normal or normal. Most steel buyers, if they want to keep their jobs, know pretty well what those three terms mean. They don't have to use slipsticks, government figures, AISI data, crystal balls—they go out in the shop and look. To ask them how many days' supply they had as of such and such a date in relation to demand for their thingamajig would get you no better answer than a plain unvarnished question, "What are they—above normal, normal or below normal?"

The survey was recent. Only 6.2 pct said their supplies were above normal. About 41 pct thought they were normal and 52.8 pct were still crying the blues that their stocks were below what they needed to keep output going at top speed. These steel buyers know that inventories are a vague thing. They can mount overnight—so can they slip away to nothing. When demand for products is heavy, inventories look small. If the bottom falls out, the same inventories look like last week's meat bill. There is nothing new in this. Those answering THE IRON AGE survey know all about that.

It can be assumed from what steel consumers said that they could make a whole lot more things if they had more steel. Whether they could sell them belongs in an economic tract. This is not one. There is no red light as far as stocks are concerned if steel buyers are to be believed. In relation to the present day tempo stocks are not top heavy. There has been a lot

of horse trading, swapping, moving around and selling of steel consumers' stocks. What steel companies sold one customer may show up some place else.

Stocks are known to be unbalanced but steel users are far from a saturated market. Every time they think they are coming close to it something happens to change the tune. Maybe it won't the next time. But it helps to confuse everybody when it is recalled that last summer a lot of steel customers thought demand for their products was off sharply. When they opened up their plant after a vacation many found their competitors had been making hay.

Demand Holds Up

There was a late surge in the fall for more steel because demand at the other end was holding up. How long steel requirements will keep ahead of the high level output is harder to guess at this year than at any other time in history. Some half-hearted attempts have been made to view the near future as bringing a correction in present high prices. Maybe it will. But the long term outlook for steel firms is good.

Most people think we are trying to take care of a potential demand that was unsatisfied because of war output. That is only half the story. Those who went through the late depression know that we are trying to satisfy a demand which has been growing since 1929. In the depression things wore out and were not replaced.

In 1937 things looked good but in 1938 fabricators coasted along at a high rate of output—only they used the steel they bought in 1937 to support the coasting. Then came the war and another 5 years of waiting.

It seems hardly likely that 2 years of postwar activity will take care of a demand that has been pushed from pillar to post for 10 or 12 years. At least that is what some of the hard-headed gents in steel think. It is their guess that when the reaction (correction, depression or movement) comes, it won't last long (about a year). It won't be deep as far as steel is concerned and it will be followed by at least 3 or 4 years of healthy steel output. It's just as easy to believe this as the opposite, but a little more costly.

Prices May Be Too Low

Now we come to steel prices. Most steel customers have been so anxious to get steel they are meek as Moses where prices are concerned. Some have paid so much in the gray market that they look at present mill prices with no chip on their shoulder. All the fire and brimstone on steel prices has come from the administration.

The government position is well taken but not when it thinks producers can make steel for love with no return for stockholders. Steel people have to stow away a little to take care of those new mills, the price of which will scare hell out of the finance departments. It is true that the price of steel governs most prices of articles made from steel. It is the bellwether. Steel is the "rock" and it is the handiest gadget to badger, control and make miserable. That's why the administration picks on the steel industry in every major crisis.

But steel prices (that part which the steel companies get) are not high in relation to everything else. They are notoriously low. They are about 40 pct higher than they were in 1939 but weekly wages in steel were 98 pct higher in 1947 than they were in 1939. The gray marketeers blithely add $150 a ton onto the mill price and get away with it.

Why doesn't any steel firm raise its prices to what the traffic will bear? That is supposed to be free enterprise. If the steel companies are the low-down things some people say they are why do they have conniptions everytime price is mentioned. The people who buy steel aren't the ones who are doing the kicking. In a survey made early in 1947 it was amazing that only 68.7 pct of steel consumers questioned thought steel prices were too high. Even in that case some meant gray market prices. About 31.5 pct said they were not too high or that they were about right.

Prices No Simple Matter

There must be some reason why the steel companies have not priced themselves out of the market. There is. They are selfish. They don't like each other. They think that if steel prices are too high their toughest competitor will come along and knock off a nice slice of their business. They think that if they raise the price of their product too high a nice long-term customer relationship will go out the window. Also they think that if they raise the price of steel too much, labor or the government will take a hunk out of it so what's the use.

Each steel firm knows that the minute it takes an unfair advantage of the present situation people will stop buying steel, the mills will get less orders, men will be laid off and the whole thing will go to pot. What some pugnacious steel men want to know, however, is why not let this happen quickly instead of stringing it out for a long period when the end will be the same anyway. The answer to that is the "end" might and probably would not be the same.

Anyone who thinks that there is no competition in the steel industry hasn't been around. On the stage or at a banquet or at a Congressional hearing steel managers look and talk alike. Most of this is a pose. Privately they often think some of their colleagues do not know enough to come in out of the rain. Every time they can give the other company a good dig to the tune of a flock of business they feel good. When some steel executive makes an ass of himself there is no more compassion in the steel industry than there is in the home block when Mr. Brown falls on an icy sidewalk.

Between now and Apr. 1 there will be enough words written to reach from here to Europe about whether or not the steelworkers will get a raise, whether they ought to get one and whether they should quietly go back to work and keep their contract (which says if no agreement is reached on wages the old rate holds for another year). Steelworkers feel that steel wage in-

About the Survey

The steel customer survey on the following pages was made within the past 2 months. The answers are recent. Letters went to 1850 steel consumers whose companies are rated at $500,000 or more.

These firms comprised manufacturers of light and heavy machines for industrial, domestic, agricultural, construction and commercial use; motor vehicles, engines, parts and accessories; and a wide variety of stamped, machined and fabricated metal products.

Returns were received from 507 companies, or 27.4 pct of the total letters sent out. In market research activity this is considered to be an exceptionally high percentage for sample testing.

Because the questions were simple and because the answers were straight to the point no elaborate weighting methods were used. They were not necessary. The answers speak for themselves.

creases did not touch off high prices. It makes no difference to them what is presented to prove they did. They don't or won't believe it.

Anyway steelworkers don't think much of economics. They work hard, eat a whole lot and talk about the same things that other people do. But they don't give a damn for statistics or what the cost of living index says. Here are a few things they think about the Bureau of Labor Cost of Living Index:

(1) Most steelworkers eat one or two meals besides the three they eat at home. They say they pay a lot more than the index shows. When it is hinted that they ought to eat less—we leave their answer to you.

(2) They think the rent index is a phoney. They say there are hidden costs. Most people who have rented a house or apartment or paid the extra curricular charges for a new home, know what they mean.

(3) As far as the clothing index is concerned they say a price is one thing and quality is another. What about the kids' suits they say which cost a whole lot more and last half as long. Is that a small increase in price or a doubling or tripling of price. If it isn't suits they will talk to you about shoes, shirts or anything that goes into their home.

(4) The index applies to someone else not to them. They say they haven't any money left after pay day. Anyway where do those indexes come from and so on.

The gist of this is that steelworkers will get a raise this year if they have anything to say. It is true that weekly wages in steel in 1947 will average $58.14, or 98 pct greater than in 1939. Already the HCL has taken about 65 pct of that but the steelworker says that is phoney. What he thinks, he will fight for—through the union.

Steel management will have a tough time figuring out what to do—give an increase and raise prices again or take full advantage of the contract knowing full well that there will be trouble. The kind that will keep output from rolling along at a time when it is needed the most. Best guess is that there will be an increase —less than last year's—and a moderate and selective increase in prices on items which are steadily losing money such as, ingots, semifinished steels, coated sheets, etc.

If there is anything more loaded with dynamite than talking about productivity of workers, then it hasn't been invented yet. But the funny thing is that there is no true or even reliable measurement of employee productivity. That's right. Because that is what the best brains on the subject from companies, union and government said about a year ago. Privately they still admit it. But there are rough (very rough) attempts. It can all be summed up in a nutshell for steelworkers. Using the American Iron & Steel Institute figures it looks as if the average number of manhours required to make a ton of steel ingots in 1947 was 20 pct less than it took in 1939 and about 12 pct less than in the war years.

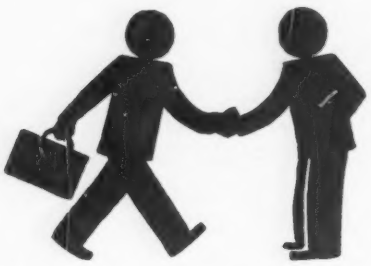
These figures are obtained by taking steel ingot tonnage and dividing it into the number of manhours worked by hourly, bonus and pieceworkers. No matter what you do with these figures or what opinion you express when using them or what interpretation is placed in them they show that in the first 9 months of 1947 it took a fifth less manhours to produce a ton of steel ingots than it did in 1939.

Management says a lot of this is due to machinery, better equipment and better relations. Labor will, and has, said it is better workmanship, bonus to the company for higher wages and a desire to do a good job. Take your pick. But before you do, be well-armed for arguments from both sides which if continued will keep you up rather late.

With public scrutiny becoming a nightmare because it is based on what management does say, or does not say, it would be well if more steel leaders used the same forthrightness (some definitely do) with the public which they use with people in their own plants. If they did, things would be a lot better—for them. Public relations men will hold your lapels for hours (in private) and say that their bosses will take the word of an engineer or a production man without quibbling. But a lot of bosses, they whisper, think they are God's chosen when it comes to public statements. Something is wrong in that alley, but that's another story.

STEEL CUSTOMER SURVEY

Q. *Are your relations with steel companies good, bad or indifferent* ?



84.3%
SAY GOOD

5.1%
SAY BAD

10.6%
SAY INDIFFERENT

Q. *Do you expect to change your source of supply when normalcy returns* ?

8.0%
SAY YES

74.1%
SAY NO

17.9%
SAY MAYBE

Q. *Is your steel inventory above normal, normal, below normal* ?

6.2%
SAY ABOVE NORMAL

41.0%
SAY NORMAL

52.8%
SAY BELOW NORMAL

STEEL CUSTOMER SURVEY

Q. *What three steel companies do you think have the best customer attitude?*

Returns are for Integrated Steel Companies

Company	*Times Mentioned*	*Pct Of Total*
U. S. Steel Corp.	268	25.5
Republic Steel Corp.	136	12.9
Bethlehem Steel Co.	125	11.9
Inland Steel Co.	111	10.5
American Rolling Mill Co.	69	6.6
Jones & Laughlin Steel Corp.	67	6.4
Youngstown Sheet & Tube Co.	55	5.2
National Steel Corp.	34	3.2
Wheeling Steel Corp.	21	2.0
Crucible Steel Co. of America	21	2.0
Sharon Steel Corp.	20	1.9
Allegheny-Ludlum Steel Corp.	12	1.1
Timken Steel & Tube Div.	12	1.1
Lukens Steel Co.	11	1.0
Carpenter Steel Co.	11	1.0
Others (10 mentions or less)	80	7.6
	1053	100.0

STEEL CUSTOMER SURVEY

Q. What three steel companies do you think have the best customer attitude?

N. H.—Vt.—Mass. Conn.—R. I.

Company	No. of Mentions	Pct of Total
U. S. Steel Corp.	18	23.1
Bethlehem Steel Co.	17	21.8
Republic Steel Corp.	14	17.9
Carpenter Steel Co.	4	5.1
Crucible Steel Co. of America	4	5.1
Jones & Laughlin Steel Corp.	4	5.1
Inland Steel Co.	2	2.6
Cyclops Iron Works	2	2.6
American Rolling Mill Co.	2	2.6
Sharon Steel Corp.	2	2.6
Others (1 mention)	9	11.5
	78	100.0

N. Y.—N. J.—Del.—Md.

Company	No. of Mentions	Pct of Total
U. S. Steel Corp.	33	22.1
Bethlehem Steel Co.	33	22.1
Republic Steel Corp.	18	12.1
Jones & Laughlin Steel Corp.	9	6.0
American Rolling Mill Co.	8	5.4
Inland Steel Co.	6	4.0
Lukens Steel Co.	5	3.4
Sharon Steel Corp.	4	2.7
National Steel Corp.	4	2.7
Wheeling Steel Corp.	4	2.7
Timken Steel & Tube Div.	4	2.7
Crucible Steel Co. of America	4	2.7
Others (3 mentions or less)	17	11.4
	149	100.0

Pa.—W. Va.

Company	No. of Mentions	Pct of Total
U. S. Steel Corp.	35	25.9
Bethlehem Steel Co.	28	20.7
American Rolling Mill Co.	13	9.6
Republic Steel Corp.	11	8.2
Jones & Laughlin Steel Corp.	11	8.2
Sharon Steel Corp.	6	4.4
Wheeling Steel Corp.	5	3.7
Lukens Steel Co.	4	3.0
Others (3 mentions or less)	22	16.3
	135	100.0

Ohio

Company	No. of Mentions	Pct of Total
U. S. Steel Corp.	53	25.9
Republic Steel Corp.	40	19.5
American Rolling Mill Co.	19	9.3
Jones & Laughlin Steel Corp.	16	7.8
Youngstown Sheet & Tube Co.	15	7.3
Inland Steel Co.	12	5.9
Bethlehem Steel Co.	11	5.4
National Steel Corp.	7	3.4
Others (5 mentions or less)	32	15.6
	205	100.0

Ga.—Tenn.—Ky.

Company	No. of Mentions	Pct of Total
U. S. Steel Corp.	4	33.3
Bethlehem Steel Co.	3	25.0
Republic Steel Corp.	3	25.0
Others (1 mention)	2	16.7
	12	100.0

Mich.

Company	No. of Mentions	Pct of Total
U. S. Steel Corp.	25	20.0
Inland Steel Co.	18	14.4
Republic Steel Corp.	13	10.4
Jones & Laughlin Steel Corp.	12	9.6
Youngstown Sheet & Tube Co.	12	9.6
Bethlehem Steel Co.	10	8.0
National Steel Corp.	9	7.2
American Rolling Mill Co.	9	7.2
Others (3 mentions or less)	17	13.6
	125	100.0

STEEL CUSTOMER SURVEY

Q. *What three steel companies do you think have the best customer attitude?*

Ind.

Company	No. of Mentions	Pct of Total
U. S. Steel Corp.	11	18.3
Youngstown Sheet & Tube Co.	9	15.0
Republic Steel Corp.	8	13.3
Inland Steel Co.	7	11.7
American Rolling Mill Co.	6	10.0
National Steel Corp.	4	6.7
Wheeling Steel Corp.	4	6.7
Jones & Laughlin Steel Corp.	3	5.0
Others (2 mentions or less)	8	13.3
	60	100.0

Wis.

Company	No. of Mentions	Pct of Total
U. S. Steel Corp.	21	33.3
Inland Steel Co.	14	22.2
Republic Steel Corp.	7	11.1
Youngstown Sheet & Tube Co.	5	7.9
Wisconsin Steel Co.	4	6.4
Others (2 mentions or less)	12	19.1
	63	100.0

Illinois

Company	No. of Mentions	Pct of Total
Inland Steel Co.	32	32.0
U. S. Steel Corp.	28	28.0
Republic Steel Corp.	9	9.0
American Rolling Mill Co.	6	6.0
Youngstown Sheet & Tube Co.	5	5.0
Bethlehem Steel Co.	4	4.0
Allegheny - Ludlum Steel Corp.	3	3.0
Wisconsin Steel Co.	3	3.0
Others (2 mentions or less)	10	10.0
	100	100.0

Mo.—Ark.—Kan. Colo.—Okla.—Tex.

Company	No. of Mentions	Pct of Total
U. S. Steel Corp.	17	30.4
Inland Steel Co.	10	17.9
Republic Steel Corp.	6	10.7
Youngstown Sheet & Tube Co.	5	8.9
Bethlehem Steel Co.	5	8.9
Others (3 mentions or less)	13	23.2
	56	100.0

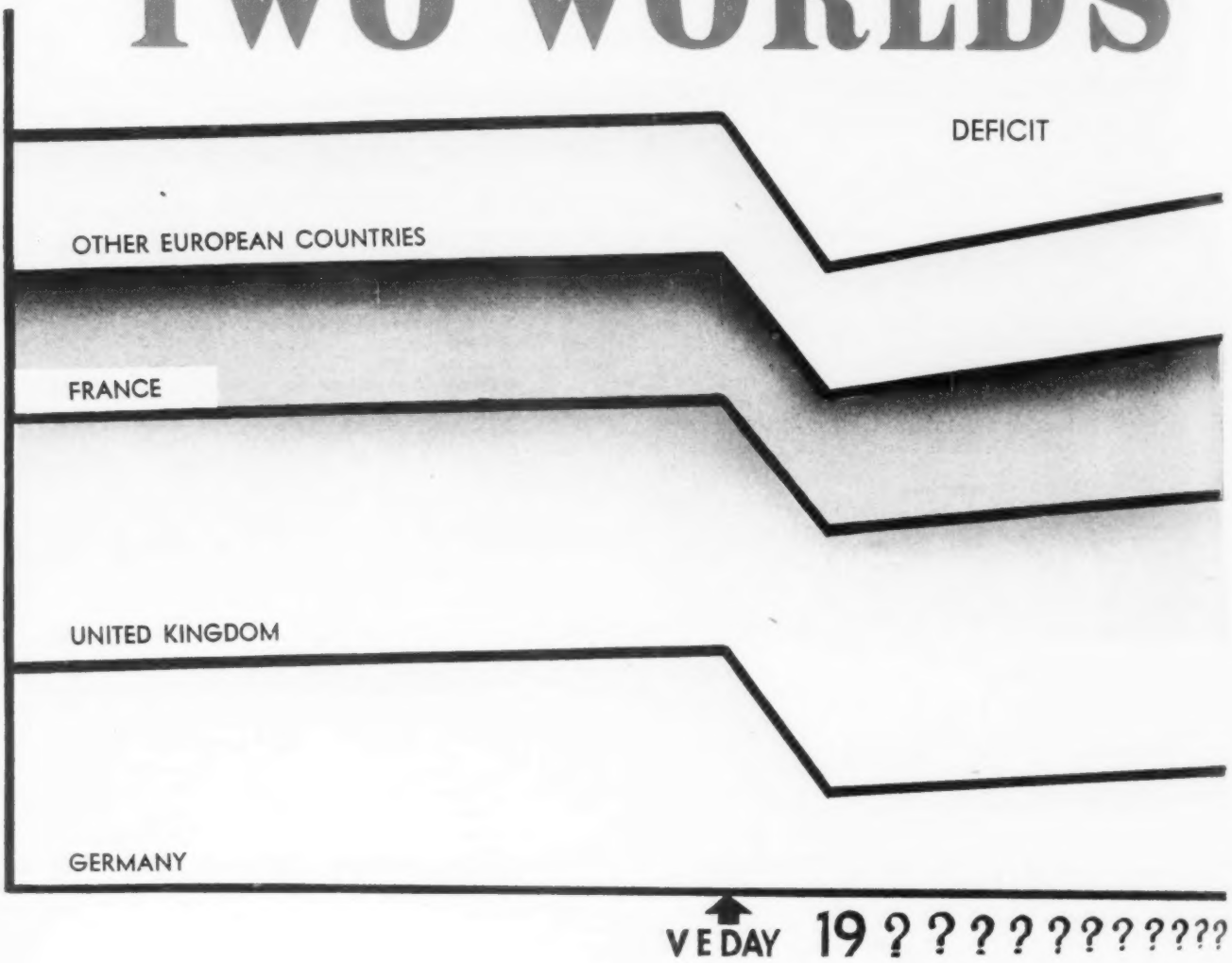
Minn.—Iowa

Company	No. of Mentions	Pct of Total
U. S. Steel Corp.	8	34.8
Inland Steel Co.	4	17.4
Republic Steel Co.	3	13.0
Wisconsin Steel Co.	2	8.7
Others (1 mention)	6	26.1
	23	100.0

Wash.—Ore.—Calif.

Company	No. of Mentions	Pct of Total
U. S. Steel Corp.	15	31.9
Bethlehem Steel Co.	10	21.3
Republic Steel Corp.	4	8.5
Jones & Laughlin Steel Corp.	2	4.3
Inland Steel Co.	2	4.3
Timken Steel & Tube Div.	2	4.3
Others (1 mention)	12	25.5
	47	100.0

TWO WORLDS



By JACK HIGHT
Assistant News-Market Editor,
THE IRON AGE

• Reconstruction of European industry moves at a snail's pace, hamstrung by old-time nationalistic jealousies and confused allied high level politics. The dream of self-sufficiency for at least essential needs grows dimmer as nations struggle with the eternal hen or the egg problem against a backdrop of bitter internecine strife. Meanwhile, the No. 1 needs for American interim assistance are listed as scrap, coke and semifinished steel.

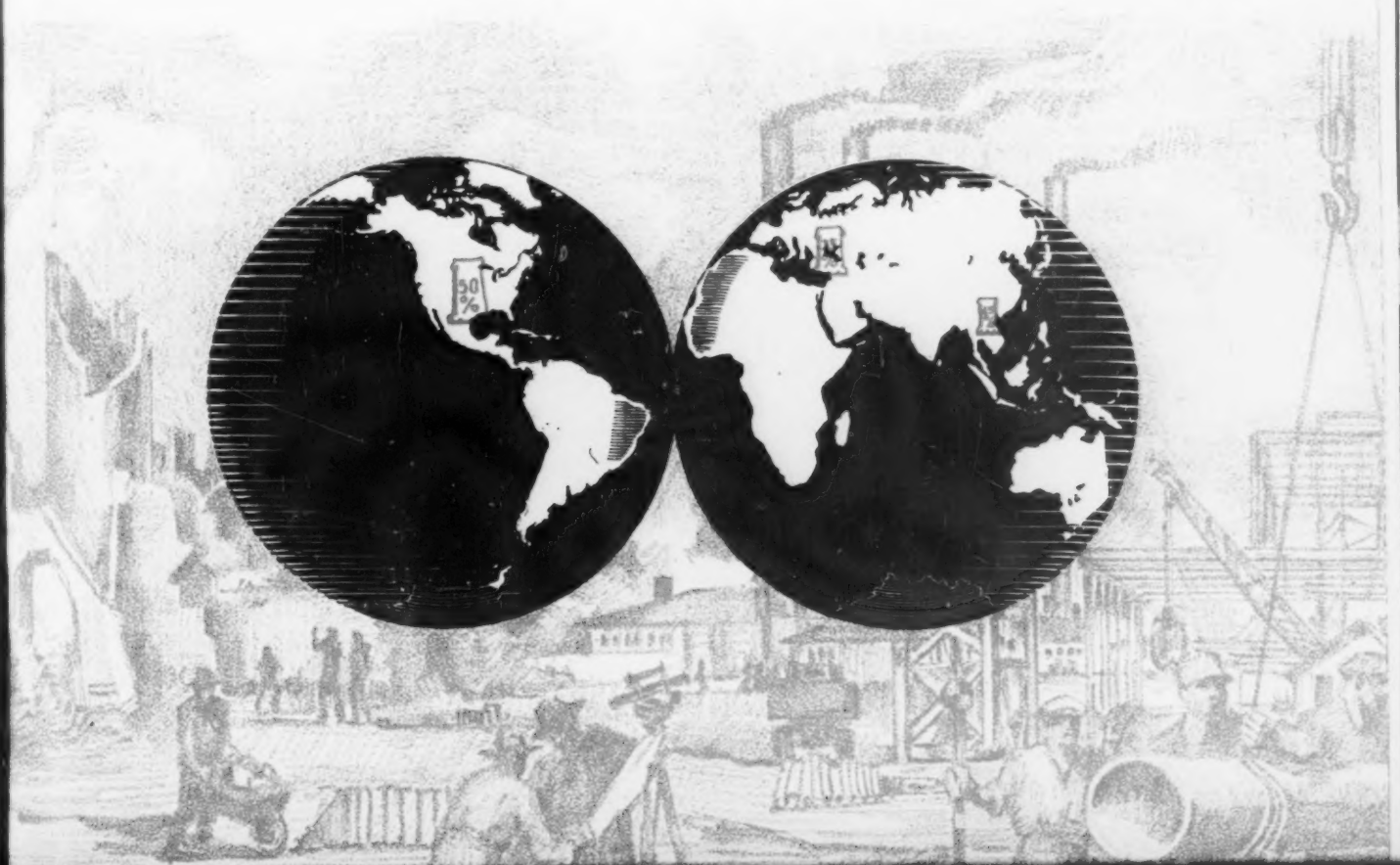
and Steel

DESCRIBING European reconstruction to a person who has not visited that shabby continent since the war opens the possibility that the reader may feel that the reconstruction is the most important factor on the scene today. That is like picking the one black sheep in a herd to describe to a blind man. One can give an adequate description of the black sheep —but the blind man somehow gains the impression that all sheep are black. Newspaper and magazine articles which describe progress in Europe can hardly find a method to properly emphasize the fact that it is the amount of work remaining to be done that is important.

It is a pitfall that any reporter may encounter. If the writer were to think now of the most impressive sight he saw in all Germany for a news picture, he might choose two tiny new shop-buildings in Julich, Germany. It would be a misleading picture. For no mere photo could describe the desolation and squalor that surrounds those two tiny shops.

Julich was the headquarters of a Panzer division, and was flattened by the full force of bombs and artillery. Standing on the highest pile of rubble, the nearest living tree is almost out of sight—there is no sign of life above ground save those two brave new shops. Yet the news in Julich is the shops, and my pictures would be of rebuilding, regardless of how pitifully small the effort.

This is, of course, the very character of news. When the rubble was being produced, that was the news of the day, but now nobody wants to see or read of it. On the other hand, if a French firm designs a new car, that is news. But the



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PRESSE IRONAGE NEWYORK

RECOVERY FRENCH STEEL INDUSTRY MAKING GOOD PROGRESS.

STEEL PRODUCTION IN 1947 WILL SLIGHTLY EXCEED 6.6 MILLION NET TONS. THE LEVEL OF 1938, FIRST TARGET OF FRENCH INDUSTRY, WAS OVERSTEPPED IN OCTOBER BY 10 PERCENT FOR STEEL INGOTS, 17 PERCENT FOR FINISHED PRODUCTS, AND AS MUCH AS 95 PERCENT FOR MEDIUM SHEETS. PRODUCTION THIS ITEM, 30,000 NET TONS, EXCEEDED BY 7000 TONS BEST PREWAR RECORD.

IMPROVEMENT DUE TO HIGH IMPORTS OF AMERICAN COAL DURING SUMMER AND RECENT SLIGHT IMPROVEMENT IN COKE DELIVERIES FROM RUHR.

PRODUCTION IN 1948 COULD APPROACH BEST PREWAR STEELMAKING RATE OF 10.7 MILLION TONS PROVIDED THERE IS SUFFICIENT COKE SUPPLY--DEPENDING ON THE RUHR FOR 66 PERCENT--AND IF THERE IS ADEQUATE SUPPLY OF SCRAP AND ELECTRIC POWER.

NEW PRICE POLICY TAKES CARE OF MODERNIZATION REQUIREMENTS. FLAT ROLLED PRODUCTS CAPACITY WILL BE INCREASED TO PUT INDUSTRY ON COMPETITIVE BASIS, IMPROVE QUALITY, AND INCREASE OUTPUT PER MANHOUR. MODERNIZATION OF EXISTING MILLS WITH AMERICAN EQUIPMENT PLANNED FOR COMPLETION NEXT YEAR.

PRELIMINARY WORKS ON FIRST HOT STRIP MILL ORDERED IN USA ARE PROGRESSING. ERECTION OF TINPLATE MILL IN EAST FRANCE HAS BEEN DECIDED AND SECOND HOT STRIP MILL CONTEMPLATED. TOTAL EQUIPMENT ORDERED FOR MODERNIZATION DEVELOPMENT PLANS NOW AMOUNTS TO ONE THIRD OF $80 MILLION PURCHASES NOW ANTICIPATED IN USA.

M. ARON

CHAMBRE S YNDICALE DE LA SIDERURGIE

PARIS

POSTWAR trade association for the French iron and steel industry is the Chambre Syndicale de la Siderurgy, with Mr. Aron as its head.

caption on the photo never mentions the odds on a Frenchman, even a comparatively well off Frenchman, getting one this year, or next year, or for several more after that.

In the steel industry, it is almost necessary to think only of the present in Europe in sheer self-preservation. Show us a man who spends his days computing the cost of the war in Europe in terms of steel, and worries where it is to be made up—and we will give you odds he is on his way to the madhouse. We have asked factory managers, government experts, and steel men in many of the cities of Europe—what is the demand for steel? In reply, we have been able to get only querulous gesticulation.

Starting as early as 1934 in Germany, war preparations started tapping off the flow of molten steel. As the years went by, more and more steel was diverted. Plows, automobiles, wire and rails were given up in favor of armor plate, gun barrels and shells. While the graph of steel production in Europe went up in the late 1930s, the steel needs of the European people were being largely ignored. Then during the war, most of the steel produced was poured into the military pot. Real demands of the populace for steel and the products thereof were of no importance. (Well, almost. In England you could get a new iron picket fence during the blackest war days if you had sufficient influence. But you needed even more drag to keep the local council from sending a man around to cut it down for next month's scrap quota.)

Then, in the summer of 1945, the mechanism of steelmaking in Europe stopped. In England and some neutral countries, it picked up after celebrations worthy of the end of the war in Europe. But in France, Belgium, Luxemburg, and the Ruhr, the mainspring was broken.

The economy of Western Europe can best be understood if one finds a map without troublesome national boundaries. The industrial area of Netherlands-Belgium-Luxemburg-North and East France-North and West Germany grew up out of the natural wealth of fine metallurgical coal in the Ruhr—and the ores of France as a secondary factor. This development grew in spite of wars, the antagonistic conflicts of nationalistic ideologies in peacetime, and the lines drawn by well-intentioned and/or mischievous politicians.

This economy has grown into a highly integrated one. The countries of Western Europe are so interdependent and at the same time so utterly dependent on the rich coal of Rhenish Westphalia that without it there has been no hope for the industries of the other countries—or Germany.

After a blank interregnum, this fabulous wealth of coal in Western Germany wound up

SET up as the new German trade association for the steel industry re-opened there under military government auspices is the Verwaltungsamt fur Stahl und Eisen. Dr. Mueller is the director.

under the control of a highly insular group of British soldiers, civil servants and socialist enthusiasts, living a life of lonely, isolated splendor in the awe-inspiring Villa Hugel outside Essen. It had been the Krupp equivalent of Mr. Hearst's San Simeon.

Here, supersaturated in the needs of Germany, effectively cut off from the annoying agony of diplomatically phrased death gasps of industry in France, Belgium, Netherlands and Luxemburg, these men and women ruled the coal mines as they chose for 2 years.

Although they operated with the best of intent, the atmosphere they lived in hardly promoted any broad understanding of the relationship of Ruhr coal to the problems of the whole of Western Europe. Until the Paris economic conference was held late last year, there was probably not a single meeting held at which the economic problems of all these countries so dependent upon the Ruhr were considered.

Barring genuine economic cooperation then, the several countries went their own way. They tackled their own currency problems, food problems, and industrial problems — catch-as-catch-can. In many fields they had considerable success. How much, shall be considered later.

In many cases the efforts made by the different countries to climb up the ladder have been subject to censure. Often the criticism has had some merit. But in every case, the road that the peoples of Europe have had to travel has been so long, and is still so long, that any step that brought about a change has seemed to be an improvement.

But from the standpoint of steel, the most important thing to remember is that the long-term demand, anyplace in the world, when all the seasonal and cyclical variations have been eliminated, is inexorably upward. The gap of accumulated steel demand for civilian uses then was widened.

While the usual production in the Western Europe industrial concentration was insignificant, demand was continuing. But superimposed on that accumulated normal demand was another staggering factor. The destruction of war added still unestimated millions of tons to the European need for steel and its products.

Now, 32 months after the war is over, current European steel production and imports do not yet approach the demand for current needs, without beginning to whittle down on that statistical backlog which has been built up since 1934. And there is but little prospect that production in Western Europe will be able to meet current needs within the next 5 years.

This huge pent up demand will never be filled. A great amount of it has already been written off in reduced standards of living for the peoples

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LEVEL OF INDUSTRY PLAN FOR GERMANY DEFINITELY AUTHORIZES 10.7 MILLION METRIC TONS STEEL INGOT CAPACITY. PUBLISHED DISMANTLING LIST FOR REPARATIONS WOULD ELIMINATE FOLLOWING FINISHING CAPACITY--STRIP 54 PERCENT, PLATES 66 PERCENT, MEDIUM SHEETS 66 PERCENT, TUBES 42 PERCENT, ROLLED PRODUCTS 35 PERCENT, FORGINGS 35 PERCENT, STEEL CASTINGS 39 PERCENT, BRIGHT DRAWN BARS 35 PERCENT, WIRE PRODUCTS 16 PERCENT, PRECISION TUBES 55 PERCENT.

WITH REDUCED STEEL PROCESSING FACILITIES POSSIBILITY OF DELIVERIES NECESSARY FOR EXPORT TO EUROPEAN COUNTRIES UNDER MARSHALL PLAN JEOPARDIZED. PRODUCTION SHIP PLATES OVER 2-1/2 METERS FOR EUROPEAN SHIPYARDS IMPOSSIBLE. BELIEVE JALTA AND POTSDAM AGREEMENTS OUTDATED.

PRESENT INTERPRETATION OF INGOT STEEL TO INCLUDE STEEL CASTINGS DOES NOT CORRESPOND TO EXACT WORDING OF NEW INDUSTRY PLAN. LEVEL AND QUALITY OF PRODUCTION ARE LOWERED AND EQUIPMENT BEING DECIMATED.

STEELWORKS DISMANTLED IN SOLE HEAVY FORGINGS PLANT--HEAVY FORGINGS PRODUCTION IMPOSSIBLE. ELECTRIC FURNACES RETAINED MOSTLY WHERE FACILITIES FOR PROCESSING HIGH GRADE QUALITIES AVAILABLE. REMAINING ELECTRIC FURNACE CAPACITY TOO LOW. OUR BID IS FOR CAPACITY FOR 425,000 METRIC TONS INCLUDING CASTINGS.

APPEARS EQUALLY IRRATIONAL TO DISMANTLE WIRE NAIL, WIRE NETTING, WIRE ROPE FACILITIES, COLD ROLLING MILLS, AND MEDIUM FORGING PRESSES. GERMAN POINT OF VIEW IS THAT BALANCE OF ECONOMY IS DISTURBED.

MAX D. MUELLER

VERWALTUNGSAMT FUR STAHL UND EISEN

of Europe. The people of Germany started this process shortly after Hitler came into power. The alleged crack of housewives—pointing to the budding Luftewaffe—"there goes our butter," was a manifestation of what all the European peoples faced during the war. So did the people in America, to a lesser extent. But even with record production, American steel industry is still trying to make up the arrears of accumulated demand.

Despite the unmeasurable pit of accumulated steel demand that has been written off by thousands of people living at far below their normal steel consumption levels, an unfathomable demand remains.

For the most part, this demand is in fact only potential. It has not been detailed as specifically as has been done here, only because the industrial and economic paralysis in Europe has been so complete. Fortunately, this steel demand will be unleashed upon the industries of Europe gradually, as the entire industrial machine recovers. But even though the vast industrial stagnation that pervades much of Europe only translates part of the potential steel need into an active form, the shortage in every country is real and acute.

American Shipments Help

Much help has been gleaned from the exports of American steel which have been going out during the past year. But those places where it is most seriously needed have generally been least able to buy. Imports that have come into the various countries, not only of steel, but of raw materials and manufactured goods, have not done a maximum of good, because the programs were non-integrated. Materials which are scarce all over the world have been channeled to the countries with the most gold to pay for them, rather than to the places where they might do the most good.

Barring the hopeful signs of the Marshall-European Recovery Program, the chaos as described here is still sliding downward. Much progress has been made since the war, by careful planning and strenuous labor in many countries. But it has been, and is built as a house on sand. The basic economic facts of Europe are largely ignored. French steel production is above prewar levels, based on high-priced American coal; Belgium is maintaining a precarious balance of trade and a bold front by exporting the basic goods which its domestic economy desperately needs. Germany is still groping blindly in the rubble and dust.

In France, steel production in October exceeded the output in 1938. But France's heavy purchases of American coal must cease. Neither the French treasury nor the French steel industry can stand the high delivered price of American coal. As an interim step, imports from the USA are essential. But they are only a stopgap, not a solution.

Interruptions in French industry caused by Communist revolutionary strikes in the late days of last year served to accentuate the problems of struggling industry. The dangerous inflation in France was also being adulterated by the strikes.

In Italy, the story was similar to that in France. Considerable progress was made until about September of last year. Within the limitations of solid fuel supplies, Italian steel production was making a good production record. But Communist led unrest marred the record of the closing months. The Italian steel companies contributing to production, however, are largely based on scrap, and supplies are very scarce. Efforts are being made to import scrap, but the world situation is little better than the Italian situation. Italy is even more dependent on imported coal than is France, and in a worse position to pay for it.

Most of the problem covered in this discussion has been described in terms relating to the steel industries and their consumers in Western Europe. The situation is not nearly so simple. It must be multiplied throughout all those industries relating to steel. The political and social problems that have grown up as byproducts of the events of the past 10 years, and the 50 before that, are also an integral part of the situation.

The European countries are highly industrialized, peopled with highly civilized nations. A sound program to rebuild would begin with a new foundation, more stable than the last. Building on the premises outlined above, an industrially idealistic way to start would be to forget political boundary lines, and with a common stable European currency, and free trade as an added inducement, integrate and rationalize all the steel companies dependent on Ruhr coal or Lorraine ores.

Short of such an impracticable proposal, another approach would be to have all the European nations agree mutually to a general customs union, a common currency, freer trade, and a maximum of mutual self-help. It has already been written that this is what probably represented State Secretary Marshall's most optimistic hopes when he took his flyer on the European Recovery Program at Harvard. Such a program would certainly assure the best possible use for the aid which will go to Europe under such a program.

A fresh approach at a joint conference in preparation for American aid might have had more chance if additional time had been available. As it was, the best recommendations that could be made for steel were a simple distillation of plans that had already been drawn up independently.

The only detailed information that came out of the Paris Conference report of the 16 nations who hope to participate in the European Recovery Program, as far as steel was concerned was rehashed plans for modernization and expansion already announced. Thus, as far as the European countries are concerned, the best way to improve steel production in Europe is for the US to do everything possible to get the Belgian industry up to the standards set by that country, the British industry up to the standards set by British officials, and so on through the list of the 16 nations.

To expect that any opposite plan, with a completely rational international program, will be devised is foolish. Whatever the political char-

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acter of Germany, and whatever the outcome of the political unrest in the other countries, an American aid program is going to be a compromise. The best that American administrators under a long range aid program will be able to do will be to act as moderators.

When money has been appropriated for such a program, there will still be time to take some steps to coordinate the expansion plans of the different European nations, arrange the construction programs in the order of their importance, and ration the available European supplies of raw materials and machinery.

It would be desirable, considering the fear of communism in the United States, if a Marshall Plan program could be drawn up in contract form: *In consideration of $20 billions in goods and services paid to us by the peoples of the United States of America we, the peoples of 16 European nations, do hereby swear and aver that we will not be Communists, ever, ever, ever.* Such a proposition would appeal to many in the United States, and would be easily understood in Congress.

But the aid program which is pending cannot achieve such a bargain for the United States. If the program is set up on a sufficiently large scale, gets under way fast enough, and is carefully supervised in operation, the ERP can make it possible for the participating countries to salvage their existing economic systems. When that has been accomplished, the peoples of Europe will be in a position to judge communism and socialism on their merits.

Efforts to legislate in Washington against socialization in England will be equally futile. The European aid money will have to be sent without strings, at least politically. There are two major parties in England today. The party in power is forging ahead with new nationalization measures in industry. But if the Conservative party were to come into power, as the representatives of capitalism in England, they would not attempt to set the clock back on nationalization. It would be no more possible for Mr. Taft to do so.

But within the strictures of political expediency, there are many practical steps that can be taken in Europe to improve the industrial situation. As long as there is such an acute shortage of raw materials and manufactured goods of all kinds, there can be no question of a return to free controlless economies. The planned economies of today in Europe are creatures of emergency situations. If they surmount the crises, there will be time to debate their ultimate fate in the future. But even if we cannot dictate politics to Europe, we can supervise, to some extent, expenditures. While America is pouring aid into Europe, it would be foolish

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PRESS IRONAGE NEWYORK

PRODUCTION FOR NEXT YEAR IS SCHEDULED AT 680,000 METRIC TONS PIG IRON--65 PERCENT OF PREWAR, 2.5 MILLION METRIC TONS STEEL INGOTS AND CASTINGS--105 PERCENT OF PREWAR, AND 2.45 MILLION METRIC TONS FINISHED STEEL--130 PERCENT OF PREWAR.

FINISHED STEEL PROGRAM WILL REQUIRE IMPORT OF 0.7 MILLION METRIC TONS OF SEMIFINISHED STEEL. ENTIRE PROGRAM WOULD REQUIRE FOLLOWING IMPORTS--PIG IRON - 300,000 METRIC TONS, IRON ORE - 500,000 METRIC TONS, MANGANESE ORE - 75,000 METRIC TONS, SCRAP - 700,000 METRIC TONS. ADEQUATE SUPPLY COAL IMPORTS ALSO REQUIRED.

REPAIR OF WAR DAMAGED INTEGRATED PLANTS WILL TAKE MANY YEARS. CONSEQUENTLY 1948 PRODUCTION WILL BE ALMOST EXCLUSIVELY WITH SOLID CHARGES AND PARTLY IN OBSOLETE PLANTS. NEXT YEAR WILL SEE EXPANDED EFFORTS TO REBUILD INTEGRATED PLANTS AND BEGINNING OF ROLLING MILL MODERNIZATION PROGRAM.

TOTAL COST OF MODERNIZATION-RECONSTRUCTION PROGRAM FOR ITALIAN STEEL INDUSTRY ESTIMATED AT $170 MILLION. ITALY WILL NEED FOREIGN CREDITS--DEALS ARE PENDING TO OBTAIN CREDITS.

DUE TO BEST POSSIBLE UTILIZATION OF PLANTS AND LABOR ECONOMIC SITUATION WILL IMPROVE IN 1948, BUT NORMAL COSTS WILL ONLY BE ACHIEVED WHEN RECONSTRUCTION AND MODERNIZATION ARE COMPLETED, FREIGHT RATES ARE STABILIZED, AND RUHR COAL IS BEING DELIVERED AT CORRECT MINE PRICE--AND NOT ACCORDING TO THE PRICES ESTABLISHED ON THE POLITICAL CRITERIA OF PRESENT TIME.

ING. OSCAR SINIGAGLIA

SOCIETA FINANZIARIA SIDERURGICA

to advocate a policy that would permit American aid to be dribbled away on trifles.

The most solid factor in Europe at present is the fact that there is in each country, in spite of politics, hunger and ruin, a body of labor that is willing to work, and is skilled in industry; and there is a body of technicians who know how to carry on research and development work for industry. In some countries, the war resulted in a segment of top industrial management being removed, but in England, and several other countries, the management as well is intact.

As long as there are large numbers of people willing to work, some factories to do the work in, and some management and technicians to provide leadership, there is promise for the future. Italy is an exaggerated example of this. About the only real resource for iron and steel production which Italy has is some cheap waterpower (mostly of a seasonal character), some existing production units, and an ample supply of highly skilled labor available at fairly low rates of pay, as well as capable direction.

But nearly all the standard criteria accepted among steel men in the United States for the location of a steel mill are absent—no coal, no good ores, insignificant tonnages of scrap. All must be imported. There is, on the credit side, a highly developed engineering industry to consume the steel.

In the case of Italy, Fascists fostered the construction of three modern integrated steel mills on the coast. These were the targets for greatest war damage that was suffered in Italian industry. Despite the long road that must be followed in their repair, it is believed that they will come back into production, and that the steel industry in Italy will prosper.

The dominant factor in such an opinion is the skill of Italian technicians, and the willingness of Italian labor to work. In this writer's experience, there has been a strong feeling in Italian industrial centers that the only way in which Italian peoples can redeem themselves in the eyes of the world is to work. They have done so. Whether the antiquated structure of Italian society can withstand the shocks of communism must be decided in the next year, but if it does, there will be a bright, if distant future for Italian industry.

Sound Foundation in England

Similarly in England, it has been easy for some American newspaper correspondents to write the United Kingdom off as a dead loss, and as a result there are some in America who consider it fashionable in conversation to follow suit. There are certain basic facts about the British Empire, which are seldom discussed in England, much must be accepted. There were certainly many British subjects living, particularly in the south of England, who for the past 75 years, more or less, have been living off the income from investments in the colonies, or have been employed by people who were.

There is without question a downward trend in the income from those colonial investments today. There is a powerful trend in the colonies toward better living and working conditions for native labor. The rich tin mining, rubber, and cocoa plantations will not be pouring as great profits into the United Kingdom as before the war.

The gradual trend toward increasing autonomy among the segments of the Empire also will have inevitable economic repercussions. The loss of income from Indian investments will be felt in London for many years. In the same fashion, the gradual movements in Burma, Malaya, Egypt and the Sudan, taking those countries outside direct domination in the direction of a measure of self-rule will tend to reduce the income from investments in those areas.

But after all such factors are considered, there is another section of England and Scotland that must be considered. There is a strong industrial basis for the history of the United Kingdom. British scientists, technicians, and labor are still potent beings. They, like most working people throughout the world, have only one major asset, that is their ability to work. They are not wealthy, nor do they expect to be. Their interest in England and Scotland is as a place to work.

It is true that in many respects the industries they have to work in are not the most modern ones possible. But they are certainly capable of producing at reasonable cost a share of the goods that the world needs. This section of the economy of England is tough and secure. So long as there are Welsh valleys full of willing steel workers, highly skilled men whose fathers were steelmakers before them, men who are accustomed to work, and capable, plodding men trudging to work in Sheffield and Newcastle, industrial Britain will survive.

Facilities Must be Used

The examples of Britain and Italy can be repeated in the other European countries. There have been sections of those economies which must change in the face of altered world circumstances, but there is a core that will remain intact.

To give as much aid as possible to the core that revolves around steel production it will be necessary to first get as much use as possible out of the steelmaking facilities that are in existence today. Some of them are obsolete, inefficient and wasteful, but the need is so urgent that they must go at full blast. For this short range program, the urgent needs are coking coals, scrap and raw steel. Ore supplies pose no basic problem at this time.

The Paris conference of the 16 nations to participate in the European Recovery Program made a number of specific proposals to aid the coke situation. They will need to be followed up with great vigor. European countries have not done too good a job thus far of impressing on the minds of American officials the urgent need for coking coal in the exports that are leaving this country. There are steelmen in the United States who would like to cut off the small tonnages of metallurgical coal that are now being shipped. A more realistic policy in the direction and distribution of German coal production is long overdue.

In the realm of European scrap supplies there is a great amount of work yet to be done. For the past 2 years, American steel companies have been waging a sporadic war to get war scrap back from Europe. If THE IRON AGE could harness

the lung power wasted in this battle, it could set up a blast furnace of its own. The basic fault in the American effort from the beginning has been that neither industry nor government has been willing to pay for collection and transportation.

The British government has chosen to pay the costs, and has pursued a highly successful scrap collection program wherever the British Army has moved. But at the same time, due to the serious coke situation, all the European steel companies have increased scrap consumption per ton of steel produced to save fuel. France wisely took up options on much US Army scrap in 1945, and the French steel industry hoped to get sufficient supplies. The French government, however, saw fit to swap some scrap for other needed supplies with Italy in a bilateral trade deal, so the French industry is greatly concerned about its 1948 scrap supply. At the same time, Italy is depending almost entirely on small openhearth production units based on scrap, most of which has to be imported.

Scrap Missions Out

While the European countries have greatly increased scrap consumption, we have two or three missions in Europe studying ways to get scrap out of Europe. Certainly there is still a great deal of scrap available, particularly in Germany. Considerable manpower will be required to collect and prepare it, but the policy of the British Army and the British Ministry of Supply proves that it can be done. Britain has already disclosed its intention to get a million tons out of Germany this year. There is considerably more available, if the right leads are followed in obtaining it.

It seems probable that a deal could be worked out offering the participating nations the European scrap if they can make arrangements to obtain it, in return for which they forget their request for 2 million tons from the US this year. Americans in turn will give up ideas about returning to America scrap now in Europe.

From the steel standpoint, the last interim requirement is for a substantial tonnage of semi-finished steel. Both Britain and Italy have set up steelmaking programs which call for more raw steel than they have any hope of producing. Here there seems no easy recommendation. Both have asked for this raw steel from the United States. It seems unlikely that the American steel industry will feel able to spare the raw steel. Part of this problem is technological. The strong American trend toward integrated production facilities was not closely followed in some European countries. Now, Belgium and France, which before the war sold cheap raw steel to all comers, are anxious to sell finished steel products, and are withholding their ingots, billets, and slabs.

Some of the requirements will be met by the United States, and in Britain's case, there is a possibility that Canada and Australia may be able to offer a little more help than they have in the past year. Beyond that, there seems little possible relief until the industry in Britain and Italy can be balanced by new ingot production. This development cannot be expected to be much help before 1950.

An internationalized Ruhr in the political sense might make it possible to work out some sensible economic cooperation in Western Europe that would improve the entire situation. If France, Belgium, and the Netherlands had some voice in the future of the Ruhr, at least so far as their own interests are involved, the result could be only an improvement.

If such a solution were possible this year, the idle steelmaking capacity in Germany might be put to some use. It is easy to fall into a statistical error and say that there is a potential of 7.5 million tons of unused, undamaged steel capacity in the Ruhr that needs only coke supplies to become effective. There would be many problems connected with getting it into operation, but if it could be worked out that for an interim period the most efficient idle units in the Ruhr could be put to work, with the production to be split between German needs and those of the other European countries, a more realistic situation would prevail.

Meanwhile, the Scandinavian countries, which before the war leaned heavily on imports from Germany for carbon steel requirements, are going ahead with developments aimed at self-sufficiency. Expansion of carbon steel capacity in Sweden is progressing, and the project for an integrated works in Norway is scheduled for production next year.

Iron Curtain Hides Progress

In the Russian half of Europe, information on the progress of steel expansion programs and production is less easily obtainable. According to official statistics which have been released, steel output in Czechoslovakia and Poland this year has recovered remarkably, and is now running at about the prewar rate. Russia has been able to help both countries with substantial, if not huge, ore shipments, and has decreased the drain on Polish coal supplies. In exchange for the coal not being shipped to Russia, Poland has been able to barter for essential supplies from Western Europe.

In Russia itself, the wholesale expansion program outlined for the present 5-year plan and the succeeding one is going forward. As the years go by, exact figures on Russian steelmaking capacity become more obscure. The habit of releasing figures as a percent of the past year or of a base period that is also unknown gets more dangerous as the years go by.

There is information coming out of Russia concerning progress on specific development plans, and fragmentary information is available on production at certain plants. It is known that Russian plans formulated in 1945 for the expansion of its steel mills were considerably set back by the cessation of lend-lease. Orders for rolling mill equipment in this country were considerably set back as a result of the action. There are still some orders to be filled, but it will be largely necessary for Russian expansion to come from Russian resources.

There is an effort by Russian officials to set that country up as the center of interest from a steel standpoint within the "satellite" countries in Eastern Europe, but the sheer economic realities have dampened this effort. Tonnages of ore from Russia, although not huge, have been timely, but other products that Czechoslovakia, Poland, Rumania and Yugoslavia need are things which it is difficult for Russia to deliver.

The STEEL CONSUMER

• The epidemic of occupational jitters that swept the ranks of purchasing agents of manufacturing plants last year shows no sign of abating in 1948, according to this survey of the steel supply situation from the consumer's viewpoint. Despite the general pessimism, the picture is flected with rays of hope as various steel mill expansion plans move to completion. But for the average steel user, intent upon maintaining maximum production, the outlook is for another round of conversion deals, gray market offerings, substitutions and a continual fight to obtain their share.

By D. I. BROWN
Chicago Regional Editor
THE IRON AGE

METAL consumers generally regard last year as a full blown nightmare. They would like to think that the production difficulties, material shortages, rising costs and labor's continued demands are over, but they are resigned to the fact that the same conditions face them in 1948. That manufacturers made substantial profits last year doesn't seem to have soothed their ruffled nerves. They point out that profits at the present price levels can be quite misleading and in many cases fictitious. They are tired of the word "quota" and are fed up with illusory telephone offers of fantastic tonnages of hard-to-get steel.

Large and small plants alike fully expect continued shortages, even higher costs and another round of labor demands in the months to come. An even bigger bugaboo is the continual fear of pricing themselves out of a market. The longer the present trend continues, the more this specter haunts manufacturers as they all realize this condition will eventually materialize into a stark reality.

Consumers feel strongly about steel distribution, yet most of them don't want to see government allocation. Very few producers in any line of goods believe they have even partially satisfied consumer demand, and yet all are fearful lest the bottom suddenly fall out, despite assurances of the sales departments that such a thing is not immediately possible.

Last year saw the metal consumer introduced to some very fancy unprecedented practices. Many consumers declare that everyday business has deteriorated to a series of special deals, particularly in regard to steel supplies, some of which are clandestine, but all of which have been necessary to keep production lines rolling. Gray markets reached their heights last year and are still with us. In a survey conducted by THE IRON AGE last year 39 pct of the consumers blamed the gray market on themselves (see THE IRON AGE, p. 111, Sept. 18, 1947).

Conversion deals involving mostly flat-rolled products have been pushed to the limit with the companies leaning heavily on this channel of procurement reporting they have now reached the ultimate tonnage that can be secured by such methods. The most experienced companies using conversion state that ingots are now a drug on the market. The real bottleneck in the conversion picture is rolling capacity where ingots are broken down into slabs, billets, etc. Actually the crux of the situation is not rolling time on the breakdown mills, but rather soaking pit capacity. Cold ingots take twice as long in the heating pits as do the regularly charged ingots on ordinary mill cycles of production.

One large conversion user points out that the first and best possible place for the steel mills to expand would be by enlarging these heating facilities which even in normal times were a bottleneck. Substitution became prominent late in the year with flat-rolled aluminum going into many parts of products never before considered as a light metal requirement.

Rx *Aspirins, ingenuity and hope*

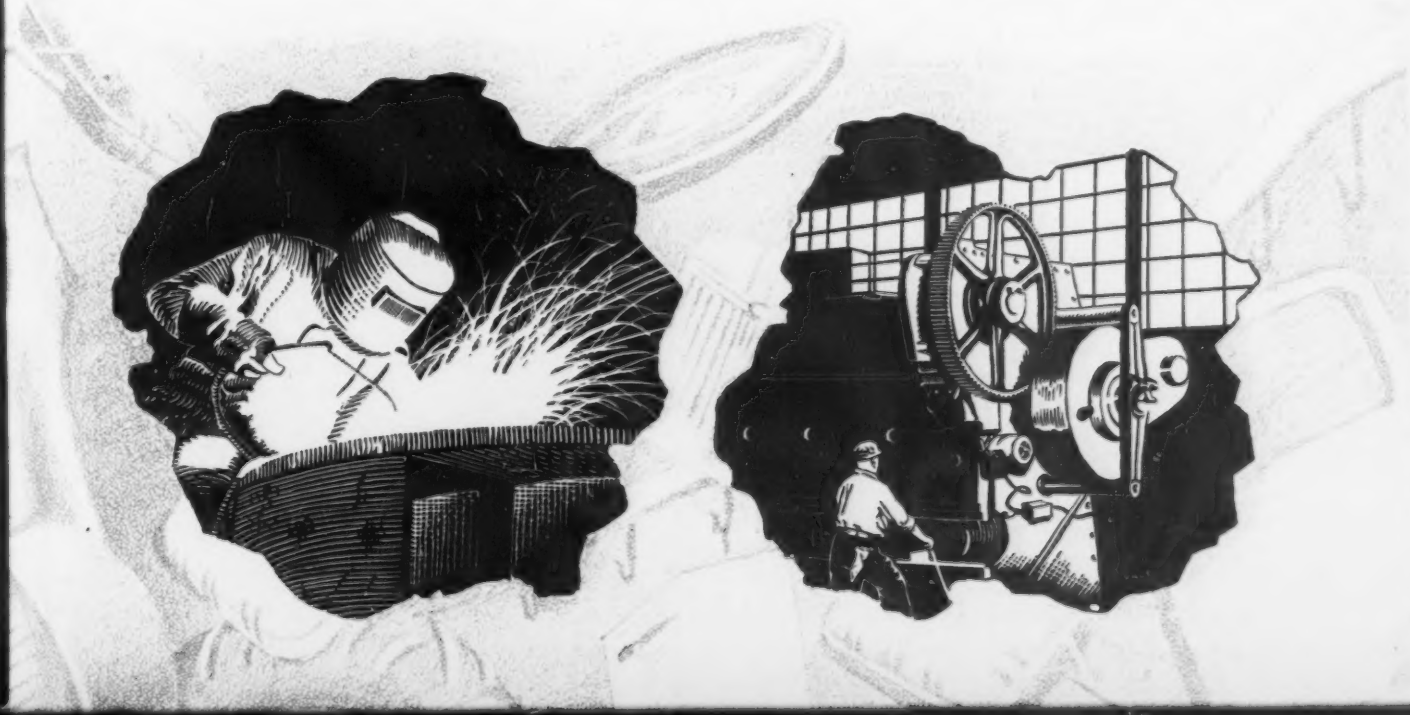
Despite all that has transpired since V-J Day, metal fabricators find themselves entering 1948 under conditions that resemble anything but a steady normal peacetime atmosphere. Most of the consumers queried by THE IRON AGE report they fully expect the worst is yet to come and none was willing to predict when the era of steel shortages might end. With all types of consumers battling for more steel supplies and storming the sales offices of the steel producers, observers predict that the "no holds barred" struggle will continue, with the big consumers throwing their weight around unceremoniously, if need be—the Senate steel subcommittee notwithstanding.

Agricultural implement makers have had a very good year despite major labor difficulties and steel and iron shortages. Most farmers have money to burn and are hungry for more machinery. Implement makers report they have not been able to satisfy the need and most makers are booked solid for 1948 and beyond. Tremendous demands for new machinery have created a black market in this field which many observers report is more widespread and vicious than that found in automobiles or steel sheets.

The implement market is somewhat different than found elsewhere. Buyers of cars or washers are usually content to wait 60 days or a year if need be, but this is not true of the farmer wanting machinery. The buyer who needs a corn picker needs it immediately. The makers report that the delay of even a week often means the farmer won't buy the equipment until next year as the operation the machinery was intended for has been done. This is true on almost all implements except general purpose tools. The fact that modern equipment pays for itself in a short time when working a good crop has served to promote the high prices offered by farmers to get machinery immediately, by any method and at almost any price.

Implement makers are uncertain about how long they can hold the present price line. They claim that at present cost levels more volume is the only anchor to current prices, and if more production cannot be achieved, implement prices are bound to go up. International Harvester in December was forced to reinstate reductions made last March, which actually increased prices on the average 2 pct over those in effect a year ago.

None of the implement makers questioned by THE IRON AGE were sure they could attain the



higher unit volume needed during 1948. They point to steel supplies which in many cases look worse than they did a year ago. Although some plants report productivity of labor has improved, it is still far short of prewar standards. Inventories are in cases unbalanced and everything is regulated to the shortest items—flat-rolled sheets and iron castings. One maker reported that for 1947 his plants received only 85 pct of the steel tonnages promised through allocations. This company in the first quarter of 1948 expects to receive as much steel through conversion deals as it will from the mills under quota arrangements, and they are hopeful, but not certain, that they can continue the conversion setup for the full year.

Despite the fact that steel sheets are the limiting factor and that this industry would probably be given preference under government controls over steel distribution, implement makers do not favor government allocations. They feel that such a system could not be fairly administered and that overall steel consumers would suffer rather than benefit.

Much has been said about the steel industry swinging more ingot tonnages into profitable items such as tinplate. Tinplate production is up and plans for the coming year show even more production is planned. Yet the container and can companies report they are faced with steel shortages. The tin can industry consumed 2¾ million net tons of tinplate in 1946. Through August 1947, consumption was running 60,000 net tons ahead of the previous year. At the moment the industry is planning on using between 3¼ and 3¾ million net tons in 1948, although the arguments going on in Washington may curtail the program. The much-discussed beer can requirement amounts to about 400,000 net tons annually, according to reliable authorities.

It is difficult to ascertain whether steel or tin itself will be the bottleneck of the container industry this year. During 1948 the government is planning to stockpile about 30,000 net tons of tin, 5000 net tons of which will be taken from industry's allocation. The balance will be built up by importing and stockpiling increased tonnages over and above tin tonnage to be allocated to tinplate makers. If production of virgin tin continues to increase, there is an outside chance that the container industry will be permitted to gear production to the fullest utilization of tin containers.

At present the steel industry has a capacity of about 36 million base boxes of tinplate a year and is planning to increase this to between 42 and 43 million base boxes. This increase, can makers report, will not be effective until late in the year, or possibly not until early 1949. For the last few years the prices of tinned containers have been out of line with the cost of the contents of the can. This has caused some switching to glass and paper containers. Now with the price of tinplate again increased and can makers making the yearly adjustment to counteract higher wages, cans are going to cost more immediately. One large can maker told THE IRON AGE that cans will go up 10 pct because of higher labor wages alone. Other costs are also up. Because of government orders M-41 and M-83, which are still in effect for this industry, the types of coatings are rigidly regulated for each and every use. This has meant that a large costly inventory of all the various grades must be maintained. New machinery installed last year in anticipation of making containers for beer and other products banned during the war proved expensive. Other improvements in food packing lines have cost two to three times more than they did prewar.

With the tin can prices going up, can makers are worrying about competition. In many lines tin can prices are so high that glass and other containers are just as cheap, and the can companies admit they are powerless to combat the situation at present manufacturing and material cost levels. One executive of a large can company has asserted that he believed it would be cheaper and more economical to make foreign can requirements in this country than to ship tinplate overseas for the manufacture of cans in other countries. He pointed out that other nations do not recognize the most economical utilization of the different types of coating. Discussing foreign practices he said that in some cases hot dipped plate has gone into gasoline cans and other containers which do not require such high grade plates.

In this country the applications are carefully regulated so that the minimum of tin is used in each and every packaging requirement. The tin shipped overseas, be it on a completed can or tinplate, is forever lost for domestic use as the tin from used containers cannot be recovered and channeled back into the domestic tin stockpile.

Can makers have on occasion used the conversion channels to augment their supply of tinplate. One maker is planning on obtaining this year about 3 pct of its requirements through conversion. The tinplate offered the can makers by gray market opportunists has found no takers. None of the products so offered has come close to meeting the stringent requirements of this industry.

Barrels, drums, and other container manufacturers are in perhaps worse straits than the tin can makers, as far as steel supplies are concerned. Many have changed over part of their production to aluminum. Eighty-five percent of the drums manufactured in this country are made by subsidiaries of steel companies. Although the steel companies claim that these subsidiaries have not received preferential treatment, they haven't had to close down for the lack of steel, either. Containers other than the tinned type usually require hot-rolled sheets, the production of which has shrunken somewhat during the past years compared to prewar. In the months to come the percentage of ingot tons sold as hot-rolled product is destined to shrink still further, and independent companies in this field report they can see no hope for more supplies as long as the general steel shortage exists.

Railroads, historically, are large users and have always been one of the most consistent consumers of metal products.

By far the largest requirements last year were in rails and the widely publicized freight car program. Most of the cars are built by inde-

Steel Distribution by Consuming Industries (1939-47)

(In Thousands of Net Tons)

	1939		1940		Yearly Average 1941-44 Inc.		1945		1946*		1947**	
	Tons	Pct	Tons	Pct	Tons	Pct	Tons	Pct	Tons	Pct	Tons	Pct
Agriculture	1,421	3.6	1,630	3.3	1,565	2.4	2,426	4.3	2,100	4.3	2,396	3.8
Aircraft	.....	....	51	0.1	5,557	8.8	5,521	9.7	32	.06	44	.07
Automotive	5,906	15.1	7,965	16.4					7,379	15.1	10,234	16.3
Construction and Maintenance	6,100	15.6	6,936	14.3	8,379	13.3	8,353	14.7	8,130	16.7	10,069	16.0
Containers	2,978	7.6	3,068	6.3	4,216	6.7	4,333	7.6	4,749	9.7	5,589	8.9
Machinery, Tools	1,460	3.7	2,330	4.8	3,191	5.1	4,739	8.3	4,438	9.1	5,787	9.2
Oil, Gas, Water, Mining	1,842	4.7	1,900	3.9	2,221	3.5	2,670	4.7	2,480	5.1	3,688	5.9
Pressing, Forming, Stamping	1,842	4.7	2,296	4.7	2,809	4.5	3,800	6.7	3,127	6.4	3,758	6.0
Railroads	3,250	8.3	4,019	8.3	5,422	8.6	5,268	9.3	4,764	9.8	6,029	9.6
Shipbuilding	518	1.3	1,000	2.1	9,657	15.3	3,374	5.9	320	.64	358	.6
Exports	2,817	7.2	8,720	17.9	7,701	12.2	3,793	6.7	3,378	6.9	4,580	7.3
All Others	10,933	28.2	8,745	17.9	12,212	19.4	12,669	22.2	7,879	16.2	10,283	16.4
Total	39,067	100.0	48,660	100.0	63,490	99.8	56,946	100.0	48,776	100.0	62,815	100.0

* Revised. ** Estimated.

pendent builders, although the railroads are constantly enlarging captive facilities to build a larger share of the total need. During the first 11 months of last year 58,674 new freight cars were delivered, 13,345 of which were built in railroad shops. (The grand total for the year was approximately 65,000 new freight cars. The number of cars retired last year exceeded the new cars installed so we enter 1948 with even fewer cars than were available last year). Cars built by railroad shops amounted to about 23 pct of the total last year. In 1930 the railroads built only 13.1 pct of the total. The future of the car builders, some experts report, hinges on the "packaged" car introduced last year. It was claimed that on Sept. 1, 47,432 package-type units were on order and this amounted to 20 pct of the total cars on order. These standardized cars are being offered to railroads cheaper than these same roads can build regular custom-built cars, and observers are predicting that the car builders will be more than able to hold their own. To Pullman-Standard Car Mfg. Co. goes the credit for developing this design, but other larger builders have rapidly followed suit. The real competition to the independent car builders for the freight car market is not the railroad shops, but the railroad specialty makers who supply the parts to meet the individual requirements of each and every road for custom-built cars.

The car builders themselves have gone through one of their most hectic years. Under fire from all sides because of inability to produce the number of cars to which they are committed, the four largest companies found themselves by mid-year indicted for price fixing, restraint of trade and associated charges. This case is still under consideration by grand jury.

Whether the car companies are responsible for all the other claims concerning their failure to fully produce freight cars is in doubt. In November 8928 units were turned out, which was the eighth consecutive month in which production was increased. That they are partially at fault for the failure of the car program to fully get under way is not in doubt. Since March of last year the steel industry has faithfully met each and every promise in net tons of all products required. The rather lame excuse of improper inventory balance can only be laid at the door of the car makers who mapped out the initial programs.

The last act in this comedy of errors wherein the program has been raised to 15,000 cars per month in 1948, assures but one thing—this year will be a repetition of last except that the overall production will be higher. The general public is under the impression, from what they read in newspapers, that the penalty for not meeting the promised building program seems to be merely an edict to build more units than the preceding program called for. In essence this is true. When the car builders failed to meet the 5000 per month schedule on time, the ante was raised to 7000. When it was found they were behind schedule on this program, the total monthly requirement was then set at 10,000 and late last year, after failing to fulfill their predictions, the goal was moved to 15,000 per month. Other consumers whose quotas have been cut to make way for more steel to the freight car builders have in cases reached the boiling point, and may march on Washington later this year demanding a stop to such nonsense.

No car company will talk to the press representatives about the program. However, observers who have been following this sideshow predict there is not sufficient labor available for car builders to boost production to the new level and

that at the moment some car companies are up to the roof in steel inventories which will take months to work off.

Rail requirements are slightly higher than last year. The roads report they did not fully receive the total tonnage promised by the steel companies in 1947. Total production of rails 60 lb and heavier for 1946 was 1,790,311 net tons. In 1947 the steel industry produced about 2,194,000 net tons of rails 60 lb and over. For 1948 the roads report they have only been promised about 80 pct of their needs. Some of the mills told THE IRON AGE that they are convinced the roads have asked for more than is actually needed, and therefore they will receive just about what they require. Financially, the roads claim they are no better off for operations concluded in 1947 than they were in 1946. It appears that the 10 pct interim freight rate increase saved some roads from red operations so far, but they need the full 30 pct increase requested. The interim increase of 10 pct granted to the roads in October last year provided about $125 million additional revenue during the last quarter of 1947. Table I would indicate that 1947 shows a marked improvement over the previous year.

Julius H. Parmalee, vice-president and director of the AAR bureau of railway economics, had testified at an earlier ICC hearing that under present prices and wages, the carriers in 1948 will suffer the heaviest loss in the industry's history unless the commission permits the proposed increases. Although the 10 pct increase granted may keep some of the roads out of the red for 1947, Dr. Parmalee is plugging for at least 6 pct return on railroad investments.

Western railroads, big consumers of diesel fuel oil, expect this winter to be particularly bad. Railroads use about 12 pct of all the petroleum consumed in this country. A large railroad has reported that cost per gallon of diesel fuel in 1940 was 0.0402¢ per gal, in 1946 it was 0.0441¢ per gal, and for the first 10 months of last year it was 0.0630¢ per gal. Diesel fuel prices went up again in November of last year and observers predict another rise in fuel prices before the spring of this year. Fuel costs are up more than any other single item, with the possible exception of lumber, the railroads report.

Overall the railroads in 1947 experienced a rather trying year. Total carloadings were higher than either 1945 or 1946, with the total freight car pool lower than either year (see Table II). The all powerful AAR was visibly shaken when, through the efforts of Robert Young, some of the roads broke away from the old combine and formed an independent association. The full page advertisements appearing in the leading newspapers of the country criticizing the old guard of the railroads, plus the rest of a very active public relations policy, were responsible for what is now an amusing situation.

Observers report that W. T. Faricy and other spokesmen of the AAR, before releasing information to the press from their own extensive public relations system, consider first what Mr. Young's reaction and rebuttal will be before the announcements are sent out. Although much of the romance of railroading may be disappearing, the aspects of a real contest among the railroads has stimulated public opinion which observers believe will be beneficial to the industry.

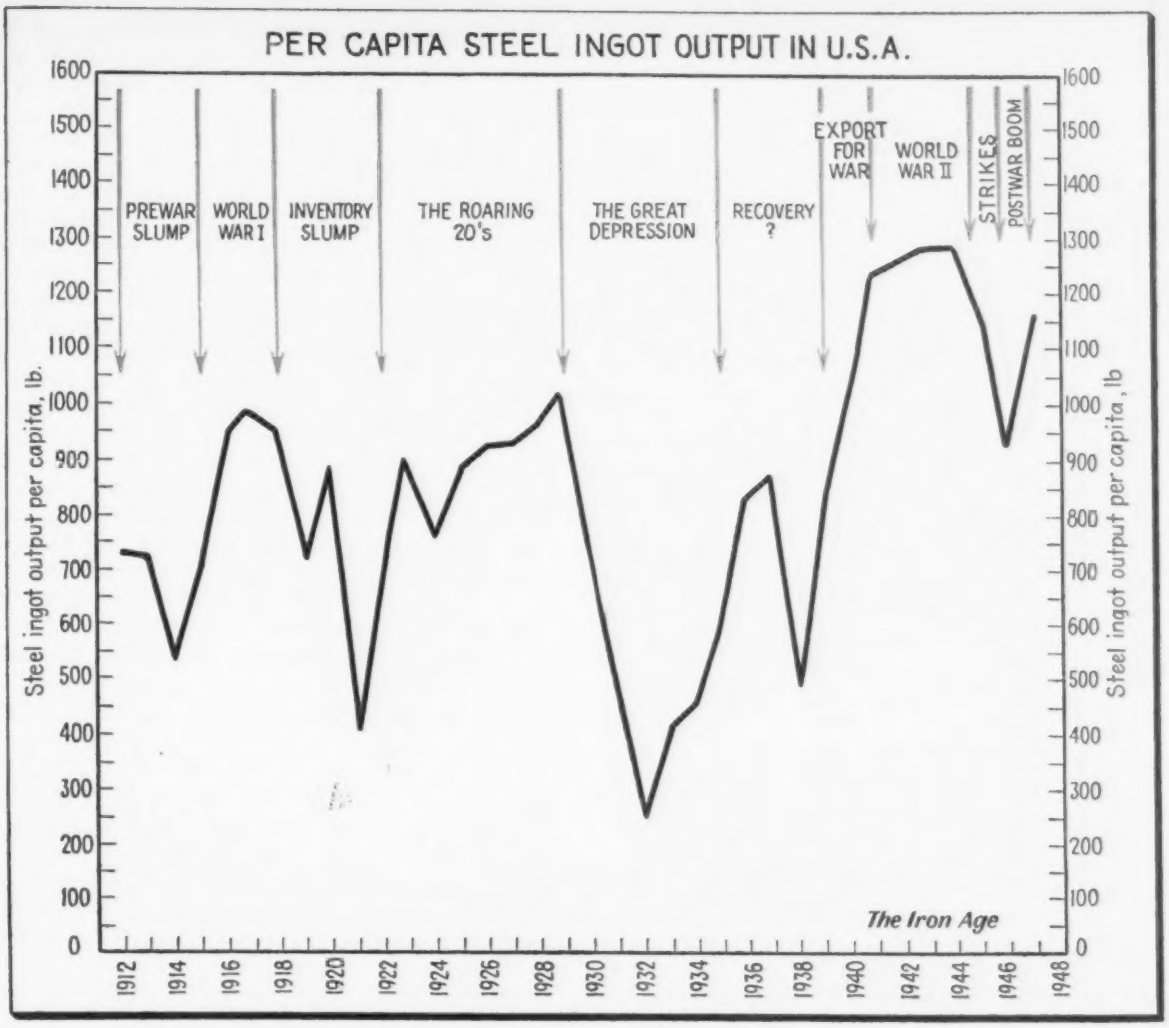
Detroit and the rest of the automotive industry concluded 1947 with the highest peacetime production since 1929. Auto executives are setting their sights higher for 1948, but few believe they can do much better than 5 million units this year. C. E. Wilson, president of GMC, however, has stated he believes passenger car production might increase by 15 pct in 1948, with truck production remaining the same. This would give a total of 5,400,000 units this year. Other than GMC, only two makers reported a belief that they could further increase their production. One of these companies is a leading independent manufacturer and the other is Kaiser-Frazer, who through their now fabulous conversion, barter and swap arrangements are doing better than any of the experts believed was possible a year ago. Early in December Studebaker moved to augment its steel supplies by purchasing the nonintegrated steel producing properties of the Empire Steel Co., Mansfield, Ohio. Kaiser-Frazer Co. has had direct control of steel producing units since its inception. Ford Motor Co. is the only other auto builder so fortunately situated, but others are expected to follow this trend before the year is over.

Auto makers are counting heavily on the increased cold-rolled sheet capacity, some of which will be in operation early this year. The weight of steel purchased for a typical 1942 passenger automobile was 3545 lb. Approximately 2615 lb, or 74 pct of the steel used in the car, was sheet and strip. Most of this flat-rolled requirement is of the cold-rolled type. New models are so designed that the percentage of flat rolled used will increase. Given even sufficient cold-rolled sheets and strip the industry would still encounter a bottleneck in wide cold-rolled sheets according to the Detroit experts.

Of all the new capacity being added only two mills are adding additional facilities which will increase the production of such sheets up to 72 in. in width. The trend is definitely toward a wider car, which means the roof, cowl and other body stampings will require very wide sheets. Detroit auto makers expressed concern to THE IRON AGE over the lack of long-range planning for wider mills in some of the mills' expansion programs. As in the implement industry, the auto makers declared that only through more volume can the price line be held.

Productivity of labor has shown an improvement in Detroit, but authorities said it was only 65 pct of what prewar standards indicate it should be.

Demand for cars according to auto experts continues to be as strong as ever. It is not believed that production has been enough to squeeze the water out of the car market so that the extent of padding can be determined. One executive who said his company has on the books sufficient orders to run all year at capacity, insists that all orders are authentic. He based his statement on the selling price of used cars, and said that as long as the "smiling salesmen" on



IN 1947 about 1165 lb of steel ingots per capita were produced in the United States. The trend is still upward.

the used car lot can get premium prices for old models, and above factory prices on late models, every order in the hands of the car maker must of necessity be considered a good order. It was the consensus of the auto executives questioned that prices will continue to go up.

Another round with labor is expected in the spring. Expected high costs of basic items were also cited. During the last 6 months of last year most auto makers were able to achieve somewhat better balance of inventories than they had had a year ago. Part of this improvement can be directly attributed to steel supplies gained through conversion. All auto companies are participating. It might also be added here that *all* steel companies are involved as far as Detroit is concerned. Executives pointed out that the high production attained in the last half of 1947 was at considerable cost as conversion sheets are expensive. The prices of such sheets were reported to be from $75 to $125 a ton over standard mill prices.

Two auto makers said the supply of steel acquired through conversion, high priced as it has been, nevertheless spelled the difference between red and black operation. Only through the increased volume permitted by more steel were some auto makers able to show a profit last year. The facts and figures concerning steel tonnages shown to THE IRON AGE proved that conversion tonnages amounted to from 10 to 20 pct of the total tonnage received by some of the car makers last year, Kaiser-Frazer excluded.

Parts makers in and around Detroit proved to be in about the same position. These manufacturers during past months have had to lean on the car makers for steel supplies in many cases. Aluminum sheets have been used and 1948 is expected to see even greater tonnages employed in auto manufacture. Already stampers in Detroit report that the aluminum sheet makers are refusing to schedule any more sheets for the first 6 months ahead as they are booked solid. Aluminum is now on a quota basis also and consumers hope that the reopening of Permanente's sheet mill in the northwest plus Alcoa's new mill in Davenport, Iowa, will help alleviate the aluminum sheet shortage. So far the bottleneck has been rolling capacity and not ingots. These same fabricators reported that in many cases the electric furnace steel ingots which are converted and end up in Detroit as sheet and strip are oftentimes limited in quality and can only be used where 90° bends are the most severe require-

ments. Deep-drawn quality needed for the large presswork cannot always be had in such ingots, and alloy residuals originating from poor scrap were cited as the cause of it all.

It appears that car production for the first 6 months ahead is headed for a slight decline over the last 6 months of last year. High cost of new dies and equipment has discouraged some builders from expanding or adding improvements. In many cases new models have been set back because of the extraordinary high capital expenditures involved when combined with what Detroit calls the "cockeyed depreciation rates" on fixed assets has discouraged even the long-range programs of the auto makers. Ford Motor Co. was forced to cancel a $50 million research program because of cost and many other programs were dropped by other makers or not even considered because of such conditions.

In general, the motor capital expects a good year as far as demand is concerned. Whether 1948 will be profitable or not is the question. One executive summed up business conditions by recalling a year ago the experts were predicting a recession. It didn't happen and today no one is predicting a general turndown in industrial or business activity. "This condition is the best indication that we are now at the peak of the boom, and the bubble can very easily burst in 1948 for the simple reason no one expects it," he said.

The oil and gas industry's chief concern during last year was insufficient supplies of pipe. Broken down into tonnages the line pipe requirement of 6 million net tons appears as the largest (see THE IRON AGE p. 113, Oct. 9, 1947.) Representatives of these industries as well as the various associations have spent all year telling the public, Congress and special committees how bad the fuel picture will be this winter, and in recent weeks the nation has seen the prelude to what may really be a body blow. With all consumers competing for a share of the nation's ingot production, the oil and gas companies have not done too badly. Pipe making capacity will eventually be increased, but until Republic Steel's new mill and the additional capacity of National Tube Co. of Lorain, Ohio, are completed, the pipe supply picture, according to fuel authorities, cannot possibly improve. Pipe users have worked the conversion deals forward and backward to the extent that the cost of line pipe per mile has in cases cost three times more than the original estimate.[1] Although crude production is up over the best war years and refineries have given a good account of themselves, there still isn't enough to go around.

The seriousness of the situation from a purely business standpoint can be appreciated by the testimony of the trial now being waged in the Appellate Court of New Orleans. In fact, all metal producers who have practiced allocation of their production under quotas are intently watching the outcome of this trial. Last year, it will be recalled, El Paso Gas Co. entered suit against A. O. Smith Corp. in the district court of El Paso, Tex. The argument was whether or not the pipe maker had fairly and equitably distributed its line pipe production. El Paso Gas Co. in all sincerity charged the pipe maker as responsible for the loss of millions of dollars of revenue because of lack of delivery of line pipe which they claimed they should have received, but which was shipped elsewhere. Although the A. O. Smith Corp. was upheld in the district court in El Paso, the case is being appealed in New Orleans by the Tennessee Gas & Transmission Co., who has entered suit against both El Paso and A. O. Smith on the same basis as El Paso Gas Co.'s original charge against the pipe maker.

The real stake involved in these court proceedings is whether or not a corporation is free to decide on how to allocate its production based on its own judgment, consumers needs, priority of orders, or historical buying history. Should the appellate court decide that the A. O. Smith Co. is guilty as charged, and thus reverse the ruling of the district court, the entire steel industry, plus many fabricators and allied companies, could logically be open to legal action of whether their allocation of scarce materials can be justified. The battle started over only 38,000 net tons of steel which is a slight indication of how serious is the pipe shortage to the gas, oil and utilities companies.

Not only line pipe, but all pipe is scarce. Garden varieties of lap and buttweld pipe, galvanized or black are in great demand with producers scheduled years ahead. Of all the tubular items, oil well casing is probably the most difficult to secure. It is estimated by the Independent Petroleum Assn. of America, that 1¼ million tons of casing and drill pipe annually is needed to carry out the necessary exploration and development programs. These are seamless products of high quality and the rolling of this pipe must compete with a host of other hard to get seamless items, all of which are rolled on the same mills. In an effort to relieve this shortage many large bar mills late last year practically discontinued rolling large carbon rounds of commercial tolerances and booked the bar mills with as much piercing round tonnage as they could make. This move has helped keep the seamless mills running at high

TABLE II

Freight Carloading and Car Ownership

Cars Loaded For Year	1947	1946	1945
Week ending Nov. 22....	40,546,776	37,658,380	38,372,554
Ownership	Oct. 31, 1947	Dec. 31, 1946	Dec. 31, 1945
Class I Railroads.....	1,725,357	1,743,008	1,759,662

[1] *The extent of conversion steel used in making some grades of pipe is indicated from A. O. Smith's* 1947 *annual report, "Our major product divisions have operated at rates limited almost entirely by the supply of materials. In fact, our tubular products division, which within recent months has operated at practically full capacity, was able to do so only because of steel procured independently by our customers and supplied by them to us. Slightly more than one half of our pipe production was made from steel furnished to us in this manner."*

rates but has left the buyers of large carbon rounds out in the cold.

Because large pipe is fabricated from plates, other plate users such as tank makers report they are suffering. The oil and gas industries are heavy buyers of tanks also and they find themselves competing with their own dollar when out trying to buy up plate tonnage for line pipe applications at the same time their tank makers are hard at work trying to secure the same item. One large oil company has gone to aluminum plates for the tops of large oil storage tanks. In the months to come there are good indications that this practice will be extended.

Pipe consumers report the only tubular products in which there is any semblance of balance is seamless alloy tubing. With about 30,000 miles of line pipe on the books, and oil well drilling crews demanding more casing to catch up on the schedule of drilling new wells, which has been estimated to be 100 million ft behind schedule, the pipe picture doesn't look good.

Of all the criticisms and complaints made by metal consumers against the steel producers, the pressed metal industry has been the most acrid. The Pressed Metal Institute, representing 200 stampers and fabricators, led by Tom L. Smith, Jr., president, rode herd on the industry all year and expects to continue. Many of the stampers belonging to this group were left without sheet supplies last year when producers pulled out of certain areas. Without a previous history with other mills these manufacturers found they could not get sheets anywhere, except gray market or warehouse. The warehouses did not have the stocks and they also exercised the quota system. In some cases the mills closest to the distressed manufacturers have helped such unfortunate companies, but mostly all they get is sympathy if the harassed sales managers of the producers have time to see them.

This desperate group asked the producers who pulled out of the far away areas to ship their old requirements on an f.o.b. mill basis. The mills have for the most part refused to do this and such stampers report they have the choice of buying gray market, using aluminum, or shutting down the plant. These smaller companies have not turned to conversion channels in any volume. This market requires large tonnage orders, plenty of money and the kind of connections the smaller plants apparently do not have. Some manufacturers have banded together and bought small steel mills. A. H. Maremont of Chicago leads such a syndicate of 25 manufacturers, who in September last year purchased the Phoenix Iron Co. In November 1945, this group bought out the Apollo Steel Co., a small sheet mill in Apollo, Pa. Operating as the Phoenix-Apollo Steel Co., the consumers who form the syndicate report they are now assured of a large portion of their sheet requirements.

Under process in the state of Ohio is the formation of an entire new pipe mill to be built by a group of pipe dealers, who have been unable to buy through their regular jobbers, warehouses, or from the mills. The coalition consists of master plumbers only and will be headed by the Ohio state president of the Master Plumbers Assn.

TABLE I

Railroad Earnings
12 months ending September of each year
(000 omitted)

Net Railway Operating Income	Before Deduction of Fed. Inc. Tax	After Deduction
1945	$2,029,072	$1,040,535
1946	84,106	437,901
1947	967,515	810,210
Net Income after Fixed and Contingent Charges		
1945	$1,628,402	$639,885
1946	*273,176*	80,619
1947	656,956	499,651

Italics indicates deficit.

The plant will consist of three 10-ton electric furnaces complete with blooming mill, hot continuous mill, picklers, continuous electric welding line plus galvanizing units. Production will include from 0.5 to 2-in. galvanized pipe which will be sold only to the members of the cartel at firm prices.

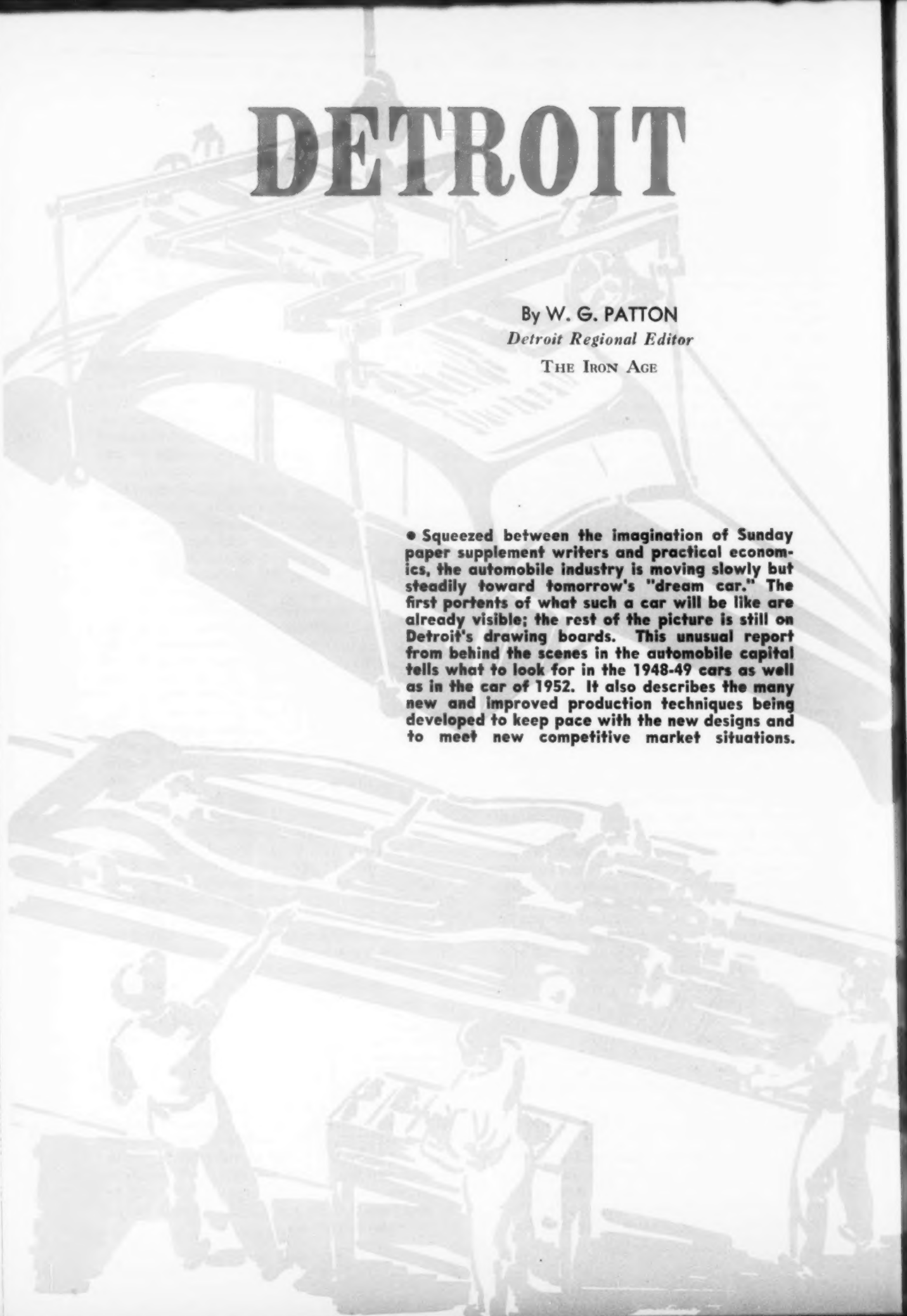
Possibly the small stampers have more than any other group investigated substitute material to the fullest extent. One large stamper in Milwaukee told THE IRON AGE that half of its deep drawn washer tub production had to be switched to aluminum. In some cases the substitution program has not added to cost. Stampers who are making deep-drawn aluminum tubs in quantity report such stampings cost 5¢ to 10¢ less per tub than the steel. However, the washer making companies have to then anodize the aluminum tub which eventually costs the consumer more money. Some stampers report receiving only 50 pct of the steel they should have gotten last year based on their historical quotas. Others were better off. But 76 pct of the whole group, when surveyed by the PMI on the question of government allocations, replied they did not want government allocation of steel. In the same survey 62 pct stated that they felt that steel producers were not allocating steel on a just basis (see THE IRON AGE, p. 119, Dec. 4, 1947).

Smaller metal users on the whole are little hopeful that 1948 will give them a better shake. They point out that a year ago the steel producers would not even listen to their pleas or just dismissed their charges as so much talk. Lately the producers have taken the trouble to discuss publicly their predicament or deny it, which stampers feel may eventually get them recognition and some relief.

It appears that 1948 could be the year, the year in which many of the smaller producers of metal products went to the wall. Or 1948 could conceivably be the year in which light metals came of age and so marked the turning point, from which aluminum eventually pushed steel out of first place as the most important metal in American industry. This year could be the peak, or the bust. But it might better be the year in which the industry finally achieved full reconversion to peacetime production—in which case 1948 will be the best year that has come along in many moons to the metal consumers.

DETROIT

By W. G. PATTON
Detroit Regional Editor
THE IRON AGE



• Squeezed between the imagination of Sunday paper supplement writers and practical economics, the automobile industry is moving slowly but steadily toward tomorrow's "dream car." The first portents of what such a car will be like are already visible; the rest of the picture is still on Detroit's drawing boards. This unusual report from behind the scenes in the automobile capital tells what to look for in the 1948-49 cars as well as in the car of 1952. It also describes the many new and improved production techniques being developed to keep pace with the new designs and to meet new competitive market situations.

evolution, not revolution

THE American motorist will have to wait a few more years for those "Dream Cars" that have been decorating the imaginative supplements of the Sunday papers. With the exception of Tucker and some recent entries in the light car field, United States car producers aren't going to bring out new cars of radical design in 1948 and 1949.

But the postwar cars of the Big Three will be new from the tires up. They will definitely have the "New Look," but they won't be strikingly different from the postwar models with continuous fender lines that are being built today by Packard, Kaiser-Frazer and Studebaker. The new postwar cars will be easily distinguished from the present models; but they may not be so easily distinguished from each other.

Passenger cars of tomorrow will be lower than most present models. They will look more like integrated units and less like an assembly of pieces of metal. Hoods will be shortened as fast as new V-type power plants become available. Seats will be several inches wider. Visibility will be increased by enlarging glass areas and lowering the belt line of the car.

Most manufacturers are expected to follow the trend of Packard and Kaiser-Frazer in which fenders are blended into and become integral with the body. Curved glass fore and aft will be featured in most, if not all, of the new models. Wraparound bumpers will be practically universal, but they may not require as heavy gage steel as the present bumpers.

The amount of chromium trim will be reduced and the present prominent front end construction is expected to be simplified. There will be fewer bars and wider openings in the grille to facilitate air flow. More forward engine mountings are anticipated and passengers will be more centrally located in the car.

The auto industry has rejected emphatically the "Dream Cars" of the extremists in favor of designs that evolve naturally from the present models. As one prominent auto engineer explains it: "There is no concept quite so sacred to a Detroit auto executive as the notion that automobiles progress by evolution—not by revolution."

The auto industry intends to stick to big cars at the risk of being criticized because its models look too much alike and require too much steel. The public with plenty to spend still wants "plenty" in its cars, according to most auto executives. The idea that an automobile should become more and more a living room on wheels appears to be an accepted theory of many car designers.

With the exception of Ford, the postwar model cars will probably be as heavy, if not heavier, than the present models. This will not apply to each model, some of which may be lighter than the present designs. However, Ford appears to be the only manufacturer who has made immediate plans both to save weight in its new model and to replace a substantial amount of steel with aluminum.

The extent to which weight has been added to passenger cars during the past 10 years is shown in table I. While the models compared in the table are not strictly comparable and there may be some minor differences in accessory groups, the figures shown are representative.

Based on a report of shipping weight of the most popular four-door sedan with standard accessories, 175 lb was added to the Chevrolet between 1940 and 1947. The increase in the weight of a Ford four-door sedan is reported to be 300 lb. Similarly, Plymouth has added 183 lb to its four-door sedan since 1940.

If the comparison is carried back to 1937, shipping weight of the 1947 Chevrolet is 225 lb greater than the model of 10 years ago. Similarly, the shipping weight of the Ford four-door sedan is up 468 lb and the weight of the Plymouth has increased 193 lb.

Automotive engineers have a ready explanation for what has happened to the weight of cars since the last prewar models. Once a model design is frozen, they point out, the tendency is always to make the car more luxurious, to add a bigger grille, include more chromium decorative trim, bigger bumpers, etc. According to some automobile stylists, the same trend toward sheer bigness has been going on in other industrial products, too—refrigerators, fans, trucks, buses and many others. Americans love bigness and luxury, they

say, and that's what the motor industry is attempting to give them.

Also, if and when there is a break in the present trend toward bigness in cars, the transition will probably take considerable time. It is well known that both Ford and General Motors, for example, have abandoned for the present at least plans for a light car. According to the results of surveys the car builders have made, what the American public really wants is a low-priced car —not a lightweight car. United States car buyers want comfort, they want top riding qualities and luxury first, so it is contended. And the public, it appears, is more than willing to pay for these luxuries while at the same time it is asking the motor car manufacturers to bring out a low-priced car!

Material Savings Seen Limited

The car manufacturers, on the other hand, see only limited savings in the cost of materials and parts even when light cars are built in large volume. Basing its estimates on the present costs of labor and equipment, Chevrolet, it is reported, concluded that a four-passenger light car could hardly be produced under present conditions to sell for less than $1000. This is one of the more compelling reasons for abandoning the light car project, it is said.

However, there is some dissent to the conclusions about light cars reached by Ford and General Motors. W. D. Appel of Willys-Overland, for example, recently told the American Society of Body Engineers that when the automotive business again becomes competitive from a standpoint of sales to the public instead of from the standpoint of getting body sheets from the mills, smaller and lighter cars will again be offered to the public.

Even those who champion big cars today admit that the scramble to take weight out of cars will be terrific when the automobile business again becomes competitive between the different car manufacturers. It is further agreed that the best opportunity to take weight out of a car comes at a time like this—when new models are being completely redesigned.

Appel's argument in favor of lighter cars is that such cars would have appreciably lower first cost, lower cost of operation and maintenance. They would also be easier to handle. He argues that by taking advantage of the new styling that moves the passengers ahead of the rear axle and allows the body to flow out practically in line with the outside of the fenders, adequate seating for four passengers can be accomplished in a comparatively lightweight car. He suggests further that the production of such a car would permit the building of three cars from the same amount of raw material which today yields only two new cars.

By reducing the thickness of seat cushions, Appel has asserted, the wheelbase could be shortened. (Appel figures, for example, that each inch of wheelbase adds about 30 lb to the weight of a car.) He contends that door thicknesses can be reduced and that the car, although small, will have an attractive appearance if height, length and width are kept proportional to the present dimensions of larger cars.

Recognizing that it is just as disastrous to offer a car that is too small as one that is too large, this engineer suggests that while it is not necessary for United States to have smaller cars, "it would be better for our pocketbook if we had light cars."

"A smaller car will inevitably replace the large cars in the same manner and for the same reason that the bungalow and efficiency apartment have replaced the 14-room house," Appel argues. "The straws are already in the wind," he asserts.

Significant changes in the interior of cars is taking place. Cotton pads, for example, are being replaced by rubberized hair pads; rubberized substitutes for hair include foam or sponge rubber pads. Smartly decorated plastics have replaced diecastings and stampings for some applications. Thinner plastic-impregnated or resin boards are replacing cardboard for auto interiors. In several models, stainless steel rolled sections have replaced chrome-plated moldings.

Plastic Fabrics Used for Body Trim

Plastic fabrics, lighter than wool or cotton, are working their way into auto body trim. Genuine leather is being replaced in several cars by substitute materials, although some manufacturers, it is reported, will offer colored leather interiors this year. Frazer-Manhattan and Kaiser Custom, for example, are already in production in a range of nine colored leather selections ranging from linden green to pepper red. K-F stylists have planned to have steering wheel and instrument panel colors which harmonize with their all-leather interiors.

Synthetic yarns are being woven into seat fabrics that are spot-proof and washable and which are reported to give double the service life of wool. These new fabrics are costly at present; they will probably be used first on station wagons and convertibles. Later on they should be available for all cars. Car designers like this new material because it "breathes."

Vinyl film is being used on side panels and doors to replace leather backed with fabric.

Also a strong trend to automatic window lifts—actuated either hydraulically or electrically—has been noted.

Another interior feature you may find in the car of tomorrow is a back window that opens to provide improved ventilation. Longer, roomier trunks are also included in the designers' plans for new cars.

There has been a successful campaign in the auto industry to cut production costs by the use of ingenious new metal fasteners. Fisher Body, it is reported, will have new door panels that slide neatly into place. The picturesque (but sometimes temperamental) tack-spitters who have been a traditional part of automobile assembly lines for many years appear to be on the way out. Fisher Body, it is reported, is planning to use a new fastener that eliminates most of the tacking from head linings. An independent car manufacturer will eliminate all tacks from its future models.

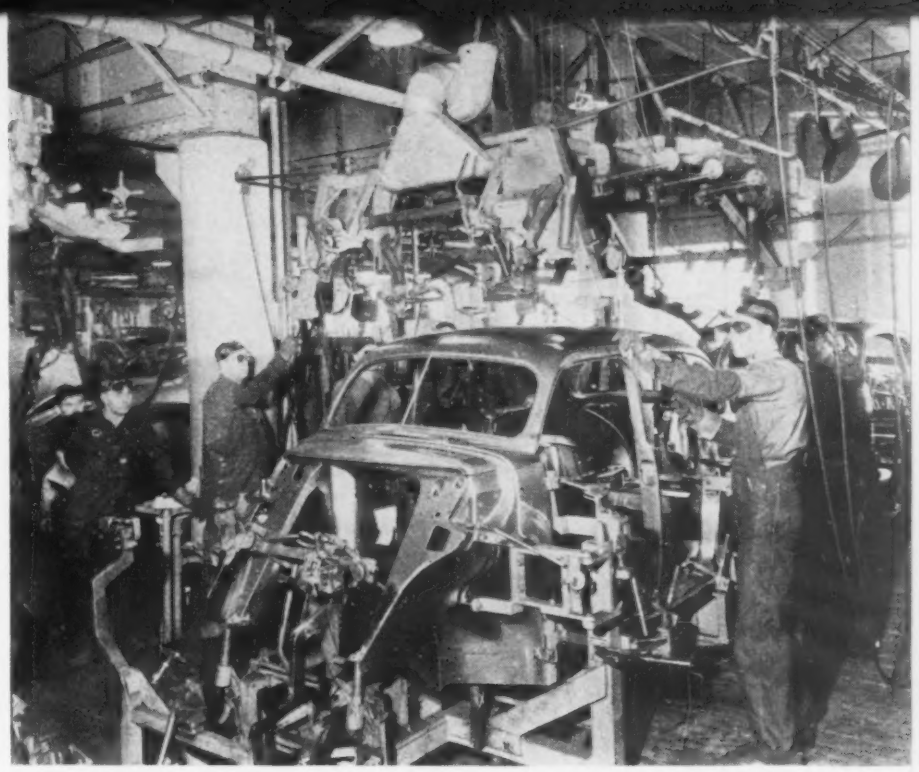
Your Automobile in 1950

The lines of the automobile of 1950 will not be radically different from current models. However, some well defined trends, apparent in several cars already on the road, will lead to modifications in the direction illustrated by this sketch. The car shown in the sketch is a composite of the ideas of top Detroit designers, as told to The Iron Age, of what the motor car of 1950 will probably look like.

The Iron Age, January 1, 1948

If present trends continue, fiber strips and tacks may be entirely eliminated from auto bodies in the next few years. Another observed trend is simplification of trim design so as to eliminate right-hand and left-hand parts.

It is claimed that any large scale removal of chromium has an adverse effect on used car values. In the competitive market of a few years ago auto manufacturers used to sell two and one half used cars for every new car. Dealers in the used car lots, it is reported, insist that in normal times they have to depend on fast turnover of their cars. Surveys made just prior to the war indicated that shiny chromium is a potent factor in selling a used car. While there may be many other factors favoring minimizing chromium trim for passenger cars, used car dealers will continue to argue strongly for retention of a generous amount of chromium on American-built automobiles.



BODIES for tomorrow's motor cars will be produced on efficient welding machines like Nash Motors' "Merry-Go-Round." Circling a battery of electric controls that measure time to the millionth of a second, Nash welds car bodies into a single unit, thus eliminating about 500 lb of steel while retaining strength and stiffness. Shown here is a body framing jig.

The trend of the industry is definitely in the direction of smaller wheels and wider rims. Tire pressures will be reduced in some cases to as low as 22 lb. The trend in favor of low pressure safety tires is already well advanced.

Springing systems and spring materials are receiving the most critical examination in the history of the industry and new springs are likely to play an important part in the competitive claims for the new Ford cars, for example. Torsion bar springing has been studied carefully by several manufacturers. It is not considered impractical for passenger cars but there are a number of manufacturing obstacles that have not been hurdled, according to leading automobile engineers. A retarding factor in changing spring systems is that the new system must be definitely better and cost less than the present method. Few new devices can pass such qualifications, it is argued.

The monocoque or integrated frame poses an interesting question for automotive engineers. Introduced a number of years ago by Lincoln, it has since been adopted by Nash and more recently by Hudson. Most automotive engineers agree that the so-called frameless car offers important possibilities for saving weight. A manufacturer who adopted this type of frame several years ago has disclosed that 75 pct of the weight of the frame was saved by the new design. Some of this weight had to be put back later, but the net result was a reduction of 50 lb in the weight of the car.

Weight of the new Hudson is said to be 9.3 pct more than the predecessor model. Hudson engineers have explained, however, that they are more concerned at the moment about producing a strong, twist-free body and frame than about taking full advantages of all the opportunities to save weight. This can come later, they say.

Another argument in favor of the unified body-frame construction is that it is stiffer and offers better protection to passengers in case of accidents. At the present time, integrated frames are not suitable for convertibles or station wagons, but it is believed that satisfactory designs for these body types have been worked out. One large producer has indicated that monocoque construction has some shortcomings for export business. GM, it is reported, has conducted extensive research on integrated body and frame construction.

In response to recent agitation in favor of a rear engine car it is known that a large Detroit manufacturer has recently conducted additional experiments to determine whether or not an engine in the rear would be practical at this time. The reported conclusion is that a better car than the present model cannot be built at the same cost with an engine in the rear.

A convincing argument against rear engine cars is that this design puts practically two thirds of the weight in the rear. Thus, dual tires may be necessary to give uniform tire wear. There are also problems in rear engine design in connection with cooling the motor and heating the car that would add substantially to the manufacturing cost. Most Detroit sources believe that a rear-engine car, if successful, will have to be promoted by some new independent manufacturer and the power plant of such a car will undoubtedly have to be much lighter than the present automobile engine.

A number of automotive engineers agree that unless some new and revolutionary power plant is developed or there are unlooked for developments which will provide cheap fuel, V-type high compression engines will power most of tomorrow's

passenger cars and trucks. In addition to tremendous potential savings in fuel, these shorter, high compression engine blocks can be squeezed more easily under the shorter hoods.

Indications are, however, that at the present rate of development at least 2 or 3 years will be required before compression ratios can be safely raised above 8 to reach a maximum of 12 to 1 ratio which was suggested at the time the Kettering engine was first introduced.

Meanwhile, at least one and probably two General Motors divisions are expected to go into production on a V-type high compression engine in the fall of 1948, which would indicate that this new engine will be available in GM cars in its 1949 models. Informed sources believe that these new GM engines will be designed so as to make it possible to operate the new designs at a 12 to 1 compression ratio when suitable fuel is available. This will mean much heavier crankshafts, new pistons, larger and more expensive bearings and a new ignition system.

While the rate of introduction of the new Kettering engine must necessarily keep pace with fuel developments, the use of high compression power plants in trucks may not have to wait on nationwide distribution of 92 octane gasoline. (While the 92 octane gasoline has some similarity to airplane gasoline used during the war, it will have to be made at much lower cost than airplane gas to be attractive for passenger cars.)

Operators of large fleets of trucks, for example, who buy gasoline in tank car lots and often have their own distribution setup have shown considerable interest in the economy factors of the new high compression engines, it is reported. Negotiations with fuel producers and truck manufacturers to produce the fuel necessary for these engines are considerably advanced at the present time. Present indications are that the lowest horsepower high compression engine being considered at the moment is about 135 hp.

Fuel Factor in HC Engines

As to the industry other than GM, the policy appears to be one of constant experimental work with HC engines with one eye on the fuel situation. As one engineer expressed the policy of his company, "As the fuel supply situation improves, we'll have a high compression engine to take advantage of the expected improvement in octane ratings."

A convenient way to visualize tomorrow's cars is to examine in detail the most recent cars and trucks. While these cars will not contain all the innovations to come along later, it is a well-known fact that there are not too many "surprises" in the auto industry, particularly if the new development is sponsored by a vendor who is anxious to see his latest device adopted by several car makers.

The new Hudson has the lowest center of gravity of any United States' passenger car. At the same time it provides more headroom. The Hudson Monobilt frames are said to be stiffer and stronger than the frame of any other car.

Passengers have been moved forward to a point 2 ft ahead of the rear axle. The engine has also been moved forward to place 55 pct of the weight on the front and 45 pct on the rear. Because of the lower car and increased streamlining, Hudson engineers report that drag (as accurately as it can be measured) has been substantially reduced.

More welding has been included in the new Hudson, eliminating many nuts and bolts and providing increased rigidity. Dual carburetion is being provided for the first time in a 6-cylinder engine which is rated at 121 hp—much higher than any other 6-cylinder engine in the industry today. The new Hudson curved windshield provides 28 pct more visibility in front. The rear window gives 558 sq in. of visual area, or 128 sq in. more than the previous model. The front seat is 64 in. wide and the rear seat only 1 in. less. The engine has improved rubber mounts, fan-blade noise has been elminated by a new acoustically-designed fan. The ignition system has better waterproofing.

Uses Two-Section Propellor Shaft

One Hudson innovation the industry as a whole may not adopt is a two-section propeller shaft that permits a low floor, a minimum tunnel for the propeller-shaft train and the use of a comparatively small shaft. Three universal joints are used.

An automatic transmission is available in the new Hudson which permits automatic driving, clutchless driving or conventional shifting—the only device of its kind available today.

Chevrolet's new truck is featuring an all-steel, completely welded cab "without an open joint or seam." The cab is much roomier, and has improved ventilation and better vision through rear and side windows. Rear corner windows help to eliminate blind spots. The cab is much better insulated than the previous model.

The frame uses all-channel steel; sections have been enlarged in depth, flange width and metal thickness. Side members extend beyond the front spring hangers to form a rigid support for the front bumper.

The new Chevrolet truck models—and the new Ford trucks to be introduced in January—feature advanced styling, greater driver comfort and bigger payloads. For the first time in the history of the industry, trucks are offering many of the refinements in appearance and passenger comfort that have heretofore been of secondary importance in truck design.

A first-class controversy appears to center around the possible use of stainless clad bumpers for passenger cars. Reports that several producers would specify clad steel for their 1948 cars appear to be premature. It is known, however, that several car companies have conducted extensive investigations of stainless clad bumpers. An advantage claimed for the stainless clad steel is that it would permit bumper designs that are not now possible because of plating limitations. Objections to stainless clad appear to stem from excessive die pickup, the necessity for painting the edge of the bumpers and the possibility of plating with chromium to match other chromium trim. Several car producers are known to be investigating the possibilities of aluminum bumpers for passenger cars. The most popular bumper

steels at present are several high strength, low alloy grades and SAE 1020. Cold-finished steel is often preferred as a means of reducing polishing costs.

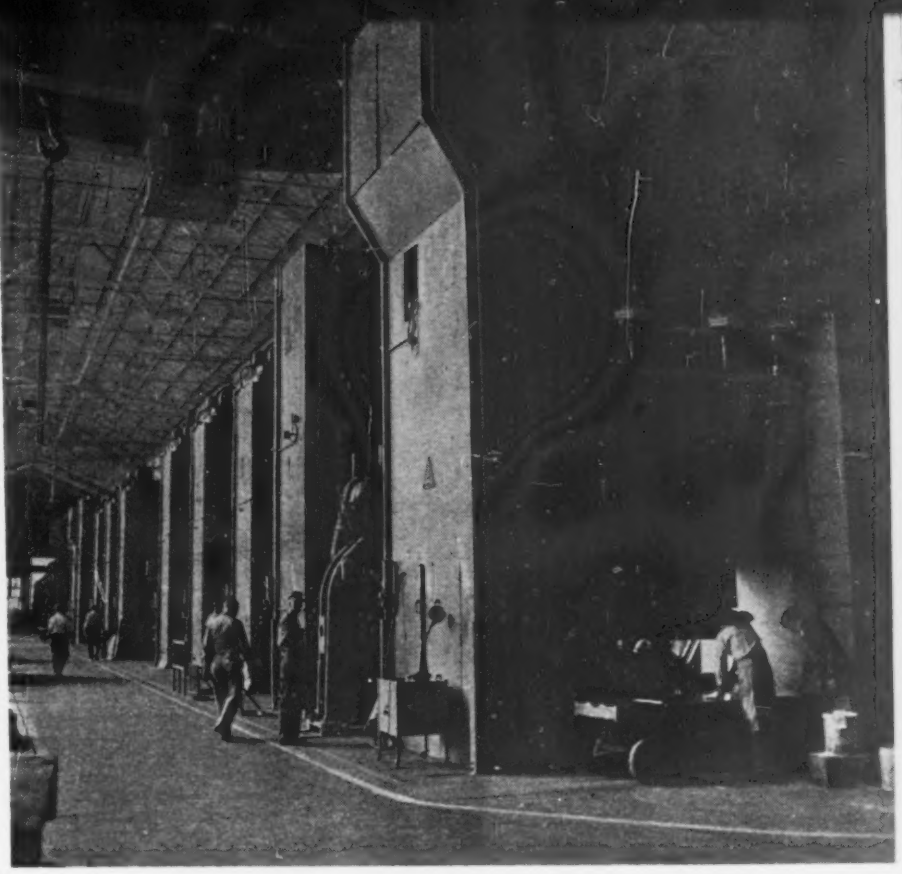
There are some scattered applications where aluminum is replacing steel in motor cars. Generally speaking such parts have no great strength requirements. Aluminum side doors and luggage doors and hoods are known to have been tried—but not with outstanding success. For many applications it is necessary to increase the gage 50 pct.

Extrusions and rolled sections of aluminum are replacing steel for some applications where they can meet the cost.

There are some formidable manufacturing problems to be considered, too—expensive scrap handling where aluminum and steel are used in the same shop, welding problems (particularly electrode contamination), finishing and painting problems.

There has been some interest in aluminum blocks and heads, and light metal pistons are finding wider use.

Machining costs are all in favor of aluminum.



GENERAL view of the new Willys-Overland Motors $5 million stamping shop at Toledo. The largest press weighs 300 tons and measures 47 ft from bottom to top. There are 53 presses ranging from small to 1400 ton capacity.

For many applications, however, aluminum still costs more than steel. But as long as it saves precious steel, a lot of aluminum is going to be used to increase car output.

Self-adjusting brakes, such as those used on the 1947 Studebaker, will undoubtedly be employed on other lines of cars. Bonded brake linings, already used on Dodge light trucks, are being given serious attention by the entire industry. The increased use of bonded linings by Chrysler, including passenger models, is expected. Bonded brake linings are also being used extensively in the replacement field. High cost of new electrical equipment is a factor retarding the application of bonded brake linings, it is claimed, although reports from the field indicate that lining wear is increased substantially by the elimination of rivets.

Informed sources believe at least one line of the five GM makes may have an automatic transmission as optional equipment by the end of 1948. The facilities of the Detroit Transmission Div. of GM have recently been expanded to permit installation of Hydra-Matic on Pontiac.

Buick will introduce a new design of its own early in January. Chevrolet is reported to have a new automatic transmission that could be ready by the end of 1948 if the competitive situation makes its introduction advisable. Most sources believe the Chevrolet transmission will not be introduced until the new Ford transmission has been announced.

Latest reports indicate that Ford now has a satisfactory design but the new transmission will definitely not be available when the new Ford cars are introduced in the spring of 1948.

At the present time there are four different types of automatic driving devices available to the motorist: Chrysler has the Fluid Drive, Hudson has an automatic transmission actuated by solenoids, Olds, Cadillac and Pontiac offer the Hydra-Matic and Buick will offer the torque converter.

At the moment indications point to the torque converter type as the kind of automatic transmission that will eventually be adopted for most of tomorrow's motor cars.

Significant improvements in automobile manufacturing operations are going forward together with modernization of car designs and power plants. One of the most promising changes in metalworking practice now being considered by the automobile industry will undoubtedly be a complete overhauling of existing forging practices, including better materials handling, new heating practices, substitution of hot extrusion for many hammer or press operations and widespread use of salt baths for preheating and annealing of forged parts.

Most metallurgists agree that these changes are long overdue, although poor plant layouts and the expense involved have delayed these modernization programs in many plants.

Ford Motor Co., it is reported, will be the first producer in the industry to have a completely modernized forging plant. For several years Ford metallurgists have been quietly experimenting with new forging techniques at the Rouge. In some cases, pilot operations have been set up to prove the new methods. At its new Canton, Ohio plant, purchased in October, Ford plans to install new mechanical handling equipment, presses and

New Ford Forge Shop Seen Operating in March

• • • Ford Motor Co.'s new forge shop at Canton, Ohio, with a capacity of 1 million lb of forgings a day, will be the most modern forge shop in the automobile industry. Ford metallurgists have for some time been quietly experimenting with new forging techniques at the Rouge plant which will likely be developed into production methods at Canton. Scheduled to begin operations in March, the Canton plant will feature new mechanical handling equipment, presses and heat treating equipment which are expected to usher in a new era in plant layout and forging practice.

heat treating equipment that are expected to usher in a new era in plant layout and forging practice. Capacity of the Canton plant will be 1 million lb of forgings a day. The plant is scheduled to begin operations in March 1948.

Complete details of the new plant have not been announced. However, it has been disclosed that three different methods for heating forging blanks will be used: (1) Salt bath, (2) induction heating, (3) controlled atmosphere furnaces. The heating method selected will be determined, it is said, by the size and shape of the part and the forging operation. Ford engineers have determined, for example, that for some parts, the presence of a small amount of salt may actually act as a die lubricant and thereby increase die life. Using any of these methods, the amount of scale is expected to be greatly reduced.

While it is expected that a number of forgings will continue to be made using the present methods, the number of parts to be made by hot extrusion will be greatly increased.

For example, at the present time Ford is making a front wheel spindle experimentally at the Rouge using the hot extrusion method. A cylindrical forging blank is placed in the press, pressure is applied and the part is extruded to its final shape. Using this method, all of the flash is concentrated at one location, and the part can be made much closer to its final size, thereby saving a large amount of machining. In addition, this particular part when made by the hot extrusion method is said to be 50 pct greater in fatigue life than the same kind of forging produced by the previous method.

TABLE I

Shipping Weight of Most Popular Four-Door Sedans With Standard Accessories

	Chevrolet	Ford	Plymouth
1947	3185	3266	3107
1946	3200	3240	3107
1945	....	....	....
1944	....	....	....
1943	....	....	....
1942	3145	3200	3060
1941	3125	3146	2959
1940	3010	2966	2924
1939	2910	2850	2919
1938	2940	2833	....
1937	2960	2798	2914

At its new Canton plant, Ford plans to use salt baths to anneal forgings, producing a uniform, readily machinable structure. After forging to shape, parts will be carried by newly-designed materials handling equipment into a salt bath to be held there at constant temperature up to 45 min depending on the size and the composition of the part. After transformation the scale-free parts will be quenched in water to remove the salt, after which they are ready for machining. No pickling tanks will be required.

Based on Ford's experience in its pilot plant at the Rouge the savings in cleaning cost should be substantial. It is also reported that machining costs have been greatly reduced. Considering the economics of the new method further, it should be observed that it is not necessary to supply heat to the salt bath; as a matter of fact, some cooling may be required to hold the bath within the desired temperature range.

It is reported that Dodge and Oldsmobile now have experimental salt baths for the isothermal transformation of forgings. These installations, being portable, can be moved from one hammer or press to another if desired. GM is said to be carrying on extensive research on salt bath annealing, with particular emphasis being placed on the effect of this process on machinability.

A number of producers are reported to be using induction hardened shafts. This avoids straightening and favors the use of unalloyed rather than alloyed steel for these parts. The use of gas carburizing equipment has become increasingly popular while pack carburizing is apparently losing ground.

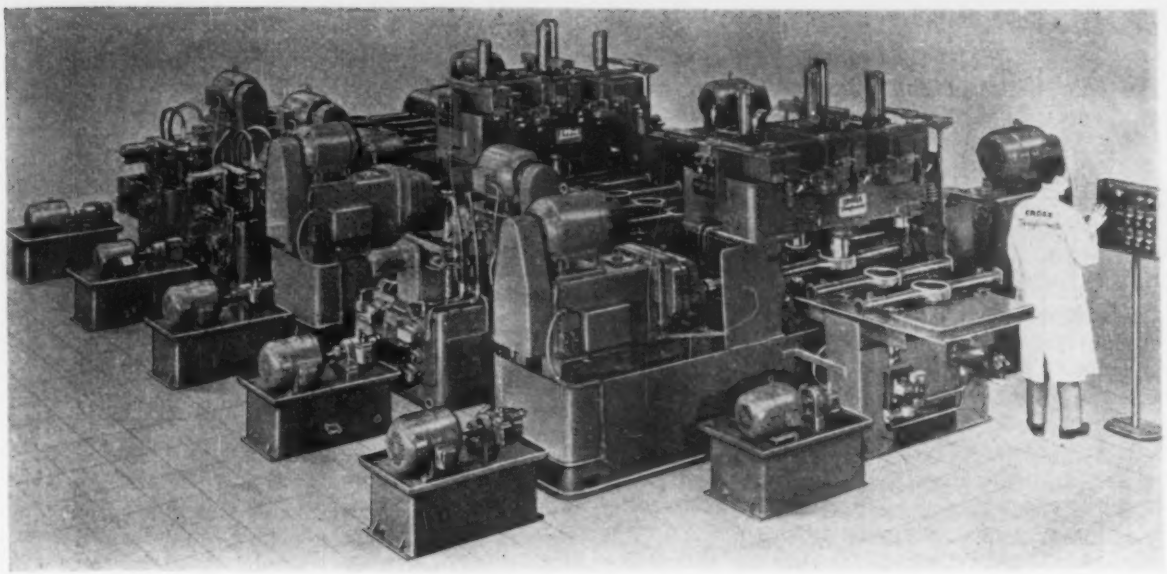
Lower Carbon in Gears

Whereas the case of carburized parts formerly contained 1.0 to 1.1 pct C, an increasing number of metallurgists now prefer a case with 0.85 to 0.9 pct C. The use of fully hardened gears carrying a thin cyanide case is disappearing, it is reported, in favor of 0.20 pct C carburized gears. The lower carbon case is said to be helpful in minimizing the presence of retained austenite in the case.

A trend away from the use of alloy steels by auto makers was apparent before car production was interrupted during the war, and this trend is continuing where unalloyed steel is available. However, shortages of plain carbon bars, particularly in the smaller sizes, have often required the writing of specifications that call for alternate use of carbon or alloy steel, particularly for highly stressed bolts and axles. At the present time SAE 8600 and 5100 are being most widely used by the auto manufacturers although C-Mo is specified for a number of parts by Chrysler as well as several other producers.

Ordering steel according to hardenability rather than chemical composition is increasing but is meeting considerable opposition from plant metallurgists who are reluctant to change from a long-established method of specifying steel according to chemistry. Despite the present resistance, most metallurgists are convinced that the hardenability basis for specifying steel for highly stressed parts will ultimately be adopted by most of the automobile industry.

Another trend in the industry is the use of controlled hardenability patterns, particularly in



CONSISTING of five two-station double-end machines in combination with a unique transfer mechanism, this Transfer-matic machine built by the Cross Co., Detroit, will produce 150 rear axle housings per hr. The machine is now operating in the plant of a large Detroit automobile producer.

parts which are subjected to heavy torsional loading such as axles. The desirability of having the surface in compression where the part is subject to fatigue failure is becoming more generally recognized.

"Dollar metallurgy"—using the smallest necessary amount of hardenability in the steel carrying the fewest extras—more than ever is being emphasized at Detroit at the present time.

The increased use of high tensile steel, particularly NAX, has been reported by the automobile industry. A number of producers are using NAX for bumpers, and some fenders, deck lids and other parts have been made from this alloy grade. Often NAX is more readily available, and can often be used without changes in the dies.

While high tensile steels have found their way into many automobile applications during the current steel shortage, their ability to hold on to their present markets against anticipated competition from unalloyed carbon steels later on is a much debated question.

There is general agreement in the automobile industry that the so-called transfer machine line offers the most promising opportunity car manufacturers have to produce in larger volume and at lower cost. Using automatic transfer devices, it is now possible to tie together a variety of machining, drilling and tapping operations (as well as washing and degreasing) into a single integrated machine. At Buick, for example, the cylinder block transfer line is nearly 1000 ft long. Transfer machine lines are also in operation today at Detroit Gear Div., Borg-Warner Corp., Nash-Kelvinator Refrigerator Div., Ford Motor Co., and Packard Motor Car Co.—to name only a few. The number of such installations on drawing boards today may well run into the hundreds.

Parts for the cars of tomorrow will undoubtedly be produced as fast as it is practical to do so on machines featuring complete automaticity. Automatic loading and unloading, automatic sizing and remarkably close control of dimensional tolerances have already been demonstrated in installations now in operation. These machines are being designed so they can be quickly changed over at minimum expense when new models are introduced.

An outstanding feature of such machines is their ability to take full advantage of the fast cutting speeds of cemented-carbides.

Auto manufacturers are using transfer machines because they offer the best opportunity for increased productivity. In most cases, less floor space is required and a substantial reduction in manhours is made possible. Where there is not an actual reduction in total investment, the savings in manhours will quickly amortize the extra cost of the machines.

A recent example is a transfer machine installed in the plant of a major auto producer for drilling oil holes in crankshafts. Including loading and unloading, this new machine consists of 28 work stations. The entire unit has 24 Avey deep hole drilling units and eight horizontal units carrying multiple heads. The crankshafts are loaded and automatically indexed, after which the part goes through the next three or four stations. At this point the part is turned 90°; it then goes through several additional stations, is again turned 90°, etc. Operating at 80 pct efficiency this machine is capable of turning out 60 crankshafts per hour. Hardness of the steel is 241 to 286 Bhn.

Transfer Machines Used

It is a reasonable prediction that because of the greatly improved accuracy, higher production rate and enormous savings demonstrated by these transfer-type machines, the entire auto industry will be using similar setups in a very few years. Motor blocks, cylinder heads, and crankshafts lend themselves ideally to this type of operation; however, parts such as connecting rods and pistons seem to be best suited for special index-type machines.

It can be predicted with certainty that all auto

producers will find it desirable to use highly specialized machine tools and to group together kindred operations so that transfer-type machines can be used to perform the desired operation. In addition, more and more parts will be designed so they will lend themselves to automatic handling. This places an additional responsibility on the engineer and designer but the potential savings are so great that the design-for-automatic-handling factor cannot be ignored.

The number of applications of welding of motor cars has increased steadily for a number of years. Evidence of further increases in the use of welding both by present users and plants not formerly classified as large users is evident to anyone visiting a modern automobile plant today.

An outstanding trend has been the development of multiple spot welders permitting 20 to 150 spot welds to be made simultaneously on an assembly. There are numerous instances where complete subassemblies, such as under pans and doors, are now assembly-welded in a single operation.

Projection Welding Expands

Larger numbers of projection welds are now being made on a standard machine, thereby reducing production costs as compared with single spot operations. Many new applications have recently been found for projection welding which eliminates surface marking and can now be used on narrower sections than heretofore. Some observers have predicted that riveting by the automobile indutry may soon be replaced entirely by welding.

Especially in thinner gage sheets, it is reported that seam welding is competing successfully with deep drawing for many applications. The introduction of new hydraulic and mechanical devices has proved effective in advancing the application of flash welding. Complex extruded aluminum sections are now being flash welded with acute angles. Some plants have indicated that resistance brazing produces better joints than where externally applied heat is used.

Evidence of the current interest of auto manufacturers in modern welding methods is shown by the work currently being done on new proposals. That the cars of tomorrow will apply welding much more extensively than the present models is scarcely open to doubt.

Following the extensive use of tungsten carbide during the war, often under wasteful conditions, the peacetime uses of this new cutting material were contracted because of the high cost. At present, the trend appears to be strongly in favor of carbides. Better rigidity of the new machine tools, better conditioning of the tools, better sharpening of tools and increased desire for fast cutting speeds appear to be contributing to the greatly increased use of carbides by the auto industry.

A trend away from brazed carbide tips in favor of clamped tips has been reported.

The use of carbide tools for planing cast iron and steel at table speeds of 200 to 400 fpm, employment of carbides for hobbing and carbide tools capable of honing 50 six-cylinder blocks per hour are typical applications.

Another recent application is the use of carbide boring bars to simultaneously rough and finish bore the wristpin holes in pistons. The pistons are machined in the as-cast condition. The wristpin holes are bored in one pass and boring is from one side only. Previous practice has been to bore with steel boring bars one half from one side and one half from the other side in order to obtain necessary accuracy and finish.

A machine being operated by a part-time operator turns out 120 pistons an hour from a single spindle equipped with a carbide boring bar. Locating, chucking, boring and ejection are all automatic. Formerly a six-spindle machine with a full-time operator was required for the same operation.

A revolving turret machine on which 10 boring bars are used produces 950 valve guides per hour. Using carbide tools, camshafts 43 in. long are being drilled one half from each end to reduce the possibility of misalignment and insure central location of the hole at each end. The material is SAE 1045, carburized to a Brinell hardness of 260 to 270.

The use of diecastings is being extended. Diecast parts, it is reported, have a better skin. Die heats are being more closely controlled and fewer cold shuts are reported. It is now possible to produce diecastings in much thinner sections, and this factor alone is expected to extend their use.

The cars of tomorrow will be better protected against corrosion than the present models. Increased use of chemical surface treatments and protective coatings has been reported. Car designers are making better provisions for water drainage. The effectiveness of undercoatings has been increased. At the same time, automotive engineers and metallurgists are increasingly aware that chromium plating simply does not protect the parts satisfactorily and is highly sensitive to corrosive attack from many sources. A search for better protection at low cost against corrosion continues to be a major research project of the auto industry.

Foundry Operations Improved

Automobile producers are making strenuous efforts to cut production costs and improve the attractiveness of working conditions in automobile foundries. Considerable redesigning, rebuilding and overhauling of equipment is being carried on. New sand systems, molding equipment and core blowers are being installed. Foundry costs are being carefully examined and the use of new core binders is being given special attention for economic reasons.

Despite better foundry equipment and product control, some foundry managers report rejections are double the prewar rate. The use of pig iron from Utah and Mexican sources, poor coke and other factors have contributed to foundry conditions that are far from satisfactory. Nevertheless, the total tonnage of gray iron castings produced in 1947 will reach an all-time high. The increased use of permanent mold gray iron castings which require less machining than sand castings has been observed.

Between January and September practically all of the automobile manufacturers except Packard, Studebaker, Hudson and Kaiser-Frazer will change models. The exact dates of introduction are in doubt. Many factors have to be considered in introducing new models, particularly at this time: The number of bona-fide orders on hand; the time required to clean up old models; the outlook for steel, pig iron, scrap and coke; wage levels; new tooling costs, and the competitive position of the company.

In the past, a model change was usually regarded as a business stimulant. Nowadays, a desire to become competitive is one of the strongest driving forces behind new model changes. The competitive angle was a patent factor in the decision of Studebaker, Packard and Hudson to retool; it will be equally strong in the case of Ford.

Between January and April, Chevrolet, Pontiac, Buick and Oldsmobile are expected to have new face-lifted models. Buick's introduction of its new automatic transmission will undoubtedly receive a considerable amount of publicity.

The Cadillac 60-62 and the Olds 98 will be introduced early in the year with major body changes. It is not believed that the power plants will be changed significantly.

Between April and Aug. 1, Lincoln, Mercury and Ford (in that order) will make their bow. All Chrysler models, including DeSoto, Dodge and Plymouth, will have major design changes, according to available sources. All Chevrolet models, Pontiac, Olds and Nash will also introduce new 1949 cars later in 1948.

Studebaker, in a good competitive position with its present design of Champion and Commander, is expected to ride through 1948 without a major change.

Packard Carries Carriage Trade

Packard introduced its new convertibles in April and its closed body types last August. At the same time Packard abandoned the medium-priced field in favor of the "Carriage Trade."

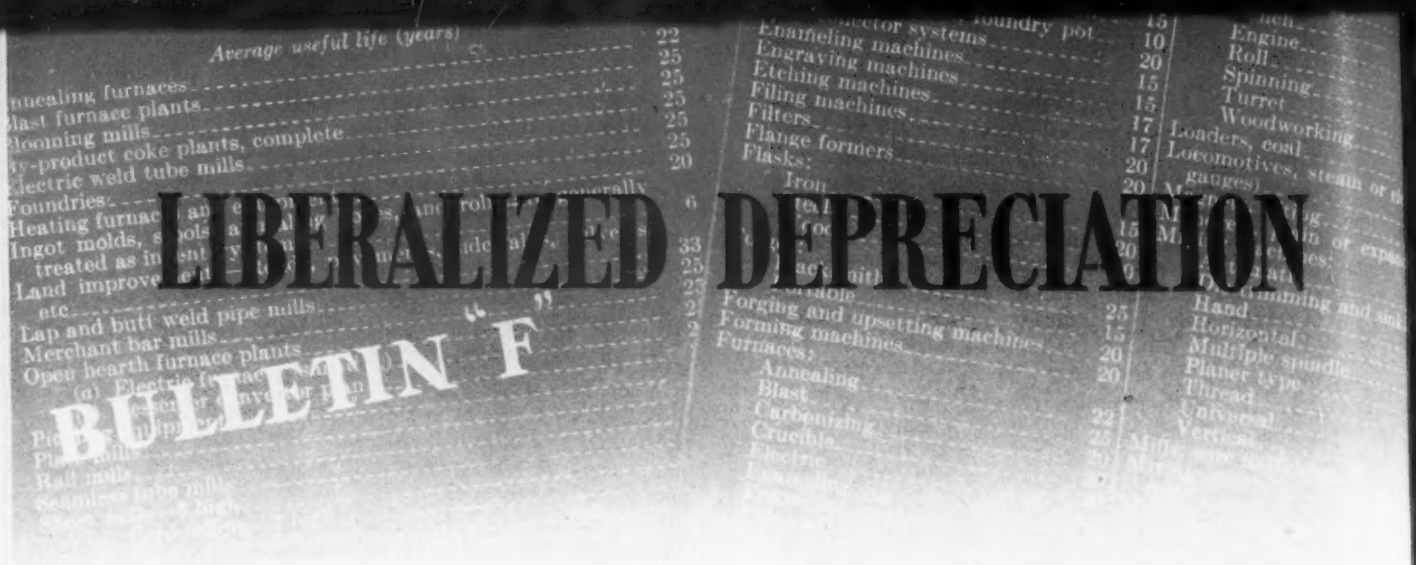
Hudson's new car with unusually low center of gravity and new body contours was not introduced until late in 1947.

Recent news dispatches indicate that the Car of Tomorrow is the Tucker, scheduled to go into production in Chicago during 1948. Featuring an unusually low center of gravity, lightweight, a new type of power plant mounted in the rear that is reported to be 500 lb. lighter than any 150 hp conventional engine, fuel injection, high frequency ignition and "the elimination of some 800 parts used in the average auto," there can be little doubt that the Tucker is the most advanced car announced thus far.

If the new Tucker actually accomplishes all the things its creator is claiming for it, and if it can be built within the cost and materials limitations it is bound to face, its right to claim distinction as *THE* Car of Tomorrow is going to be dfficult to deny.

Your Automobile of 1950

A full color reproduction of the car of 1950 will be found on p. 159. This car is a composite of the ideas of Detroit's top stylists on what the 1950 models will look like.



LIBERALIZED DEPRECIATION

BULLETIN "F"

By THOMAS E. LLOYD
Machinery Editor
THE IRON AGE

• Replacement of worn out, old and obsolete manufacturing facilities has been seriously deterred by existing tax regulations establishing depreciation allowances. An extensive survey of industrial operating and financial authorities reveals a preponderance of opinion favoring liberalization of present depreciation rates. While viewpoints vary as to the specific method to be used, there exists an almost universal opinion that modification of depreciation rates is vital to continued development and modernization of this nation's manufacturing facilities.

AMERICAN manufacturers in the metalworking industry face the serious problem of being unable to replace plant and production facilities with the normal reserves accumulated through depreciation and amortization of assets. Industrial leaders have been pointing out the dangers of this situation for some time, but their warnings have gone unheeded insofar as official Washington is concerned.

While only one phase of the American tax system, depreciation procedures form an important part. Their effect is pronounced on the vital national social-economic policy that intends to balance the financial health of industry with the needs and rights of the worker and the consuming public. Depreciation creates a complex problem requiring, for understanding, a vast knowledge of the relationship between technology and industrial economics. In effect, it demands the marriage of the accountant to the engineer.

The complexity of the problem, plus the pragmatic attitude of Treasury officials toward any policy originated outside its own hallowed chambers, has served thus far to stifle effectively any Congressional action on the matter. Yet the lack of correction of depreciation problems may have serious consequences in the near future, not only to the nation's peacetime economic health but also to its ability to be adequately prepared, industrially, in event of mobilization for war.

The editors of THE IRON AGE have interviewed many industrial executives, accounting officials, tax authorities, congressmen and Treasury

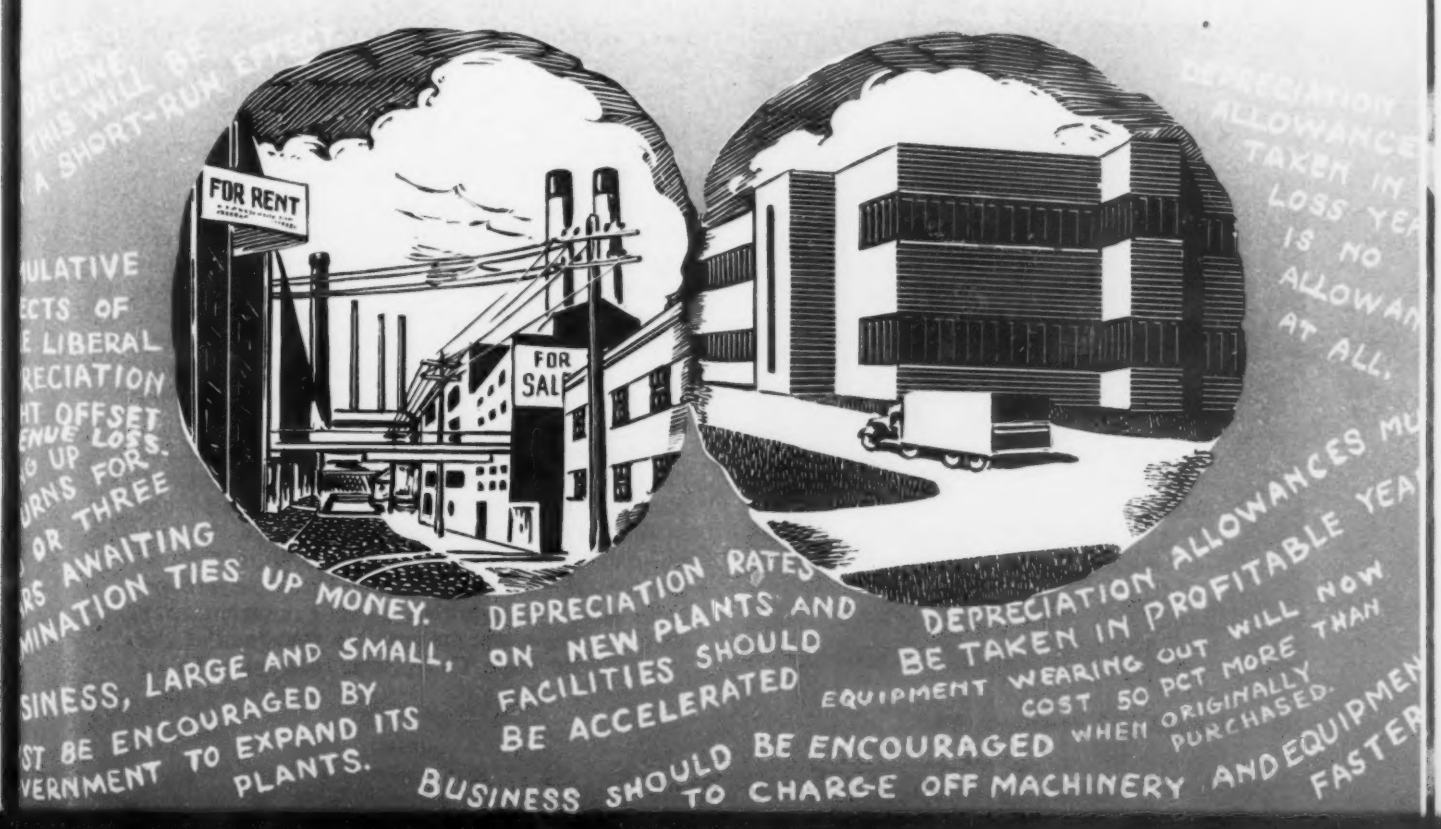
industry's vital need

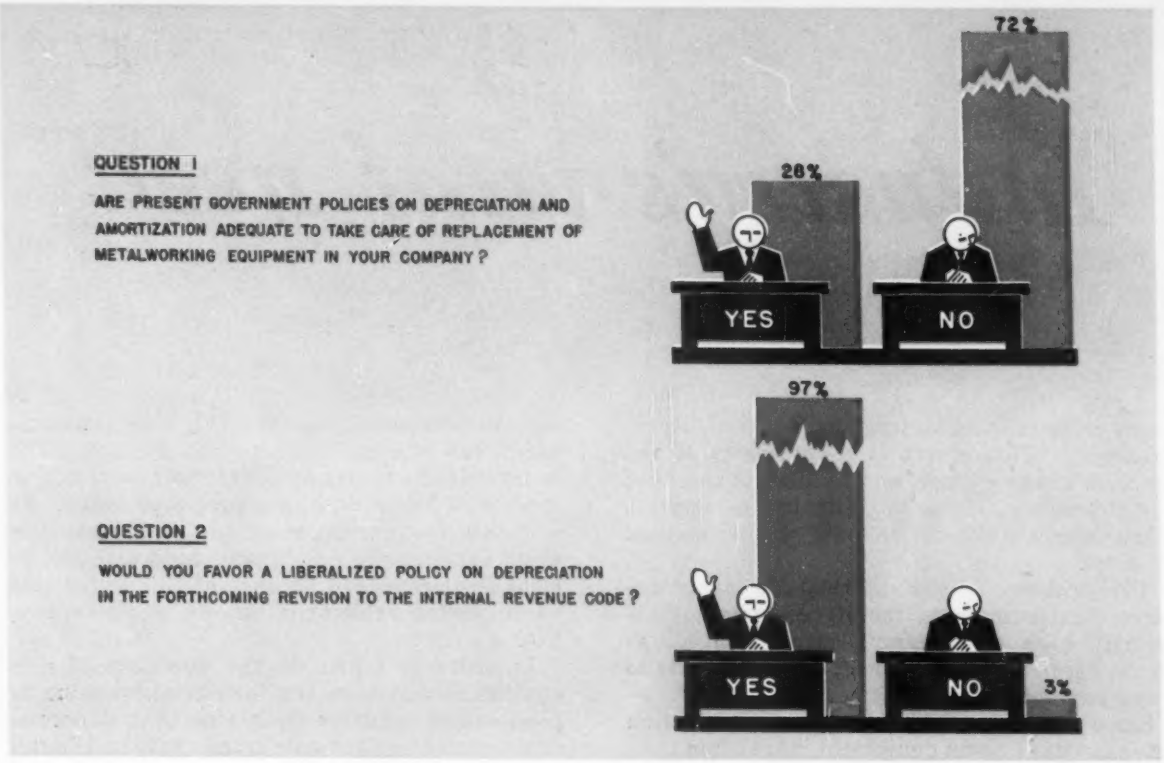
Dept. officials in collecting the material herein presented. This report is a consensus of the findings of the editors, and highlights the need for concerted action by industry to impress upon Congress the seriousness of this critical problem.

The problem is now particularly acute because construction and facility costs are at extremely high levels, and depreciation allowances, based upon initial cost, are inadequate to cover current replacement costs.

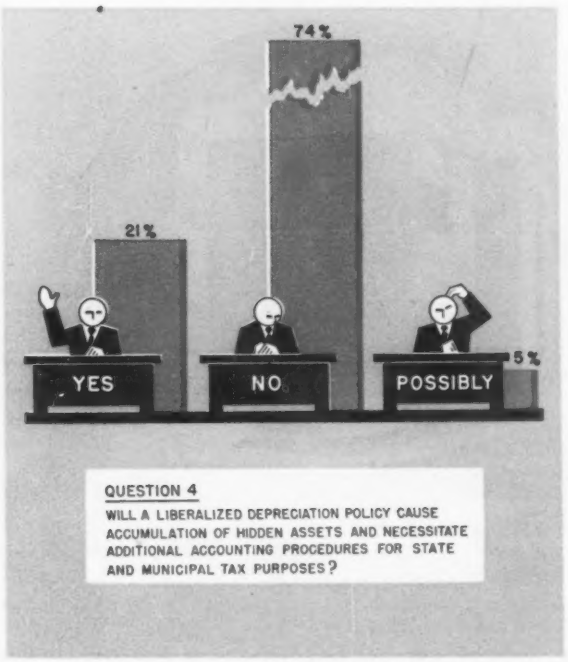
Since the rates of depreciation on production machinery and plant equipment more often than not are based upon unreasonably long estimates of useful life, in keeping with Bulletin "F"', many manufacturers find that their older equipment still has a high undepreciated value. As a result the purchase of new, more modern, more serviceable, and more productive equipment is discouraged because of this unrealized value placed arbitrarily on old equipment in use.

In order to stimulate the purchase of new equipment and keep the industrial machine in good order, industry maintains that depreciation policies as they now stand must be liberal-





An indication of the widespread interest in the depreciation problem is found in the fact that a survey by THE IRON AGE of controllers of both large and small metalworking plants resulted in the unusually high response of 42 pct. Views held by these executives are graphically portrayed in the accompanying report of the survey.



ized. A rapid depreciation policy helped Germany build up a vast war machine through industrial expansion, as did the 60-month plan in the United States during the war.

Since by any method of depreciation, no more than the original cost of any asset can be ultimately written off as depreciation, the policy of drawing out that writeoff over a period of many years and neglecting to take into consideration technical obsolescence appears fallacious from an economic standpoint. American might is dependent upon the ability of industry to keep abreast of technological developments and the ability of new industry to form and grow.

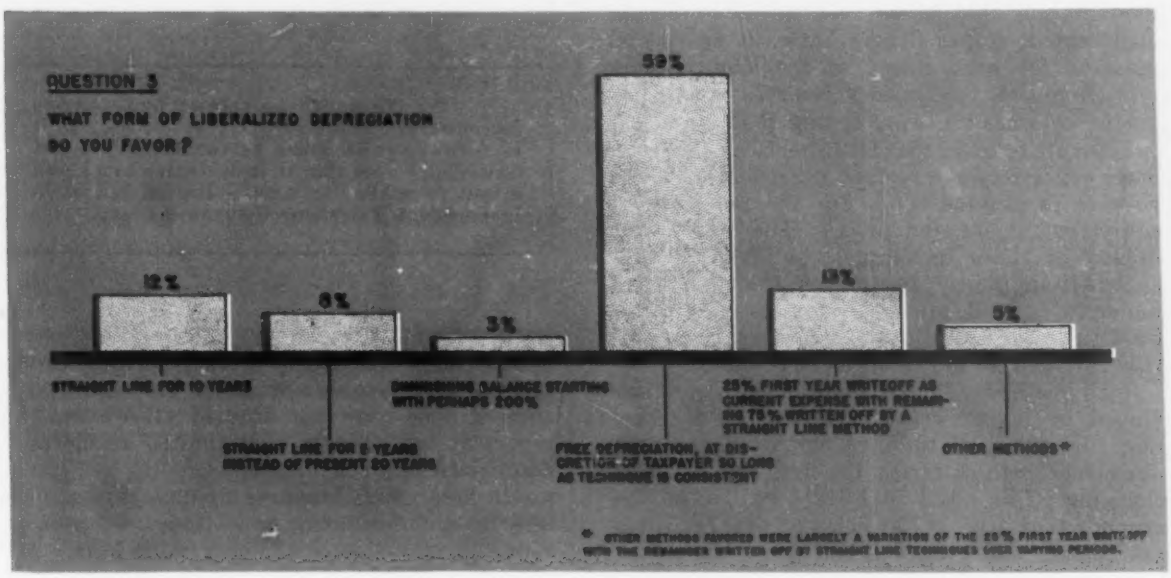
"The determination of the amount of the depreciation allowance and deduction gives rise to more controversy than almost any other item in the income tax return," stated the Magill report.[3] The most frequently mentioned point at the hearings before the House Ways and Means Committee last summer, when studies were made on possible revisions of the Internal Revenue Code, was this question of

corporate depreciation allowances and procedure. Industrialists and independent tax authorities testified repeatedly that present allowances for depreciable assets—buildings, plants, equipment, machinery, facilities, etc.—were inadequate to maintain a healthy industrial economy, to permit replacement at present cost levels, or to insure industrial adequacy in the event of a national emergency. Current inflationary conditions aggravate the difficulty, since they render impossible a replacement program at anywhere near the cost of the original assets.

While it is contended that the purpose of depreciation is to recover the original cost of the asset and that the replacement problem should solve itself through a general rise in earnings, many manufacturers raise the question, "What general rise in earnings?" Where a company showed a comfortable net on perhaps $3 million of sales annually before the war, with wartime expansion it may now barely break even on twice that volume. War expanded capacities with higher labor, material, overhead, operating and selling costs—plus past currency devaluation—have squeezed earnings for many, especially in the durable goods field, to such an extent that even a larger dollar net profit actually may be quite low when based on sales volume or invested capital.

The attempt by business to obtain liberalized depreciation is widespread and of general scope and interest. The greatest weakness in the effort appears to be the lack of uniform opinion on what shall be substituted for present methods. On only one point does there seem to be unanimous agreement, and that is that hereafter in any dispute with the Bureau of Internal Revenue over a taxpayer's claim for depreciation allowances, the burden of proof shall be placed upon the Bureau.

What is meant by the term liberalized or accelerated depreciation? Paul T. Norton, professor of Industrial Engineering, Virginia Polytechnic Institute, aptly defined it.[3] He stated that liberalized or accelerated depreciation means the process of writing off the investment in an asset more rapidly in the early years of its life than would be the case if straight-line depreciation were used with a rate based upon the full expected life. Frederick S. Blackall, Jr., president of Taft-Peirce Mfg. Co., Woonsocket, R. I., points out that the only true accelerated or liberalized depreciation policy is one that would permit the manufacturer to use any depreciation accounting procedure applicable to his operations so long as the manufacturer is prepared to follow the procedure consistently. The only restriction necessary to such a policy is that it is subject to the stipulation that it will not give him, under any possible circumstances, the benefit of duplicate deductions.



It doesn't refer to that so-called accelerated depreciation which results from increased asset usage, such as in multiple-shift operation during the war. Discussions which have appeared in tax hearings and various published statements have confused the meaning of the term.

The fight for tax reform, particularly with respect to depreciation allowances and procedures, is serious. A company which follows the traditional accounting technique of carrying assets at cost value and distributing depreciation charges over the actual physical life of the assets, well may find itself unable to replace those assets at the end of their useful life, if in the meantime replacement costs have risen substantially above the original costs. This is exactly what has been occurring during the past three decades, with minor interruptions. If, in the meantime, technological ad-

"... Business should be encouraged to charge off machinery and equipment faster. This would lead to far greater efficiency, lower cost, more stable employment, higher wages and profit, and thus more revenue through taxes at lower prices. . . . Plant operation is wearing out equipment that would now cost 50 pct more than when bought. Unless manufacturers are allowed to charge off depreciation on a more liberal basis, they will find depreciation reserves far too little to pay for new machines when their old equipment needs replacement." —George S. Eaton, National Tool and Die Manufacturers Assn.

vancement renders the assets obsolete, their undepreciated values still on the books deter replacement.

Currently, some of the larger manufacturers are dealing with the depreciation problem in different ways. Some companies have increased depreciation charges in recognition of higher replacement costs. Others have set up special reserves for replacement of facilities. Others rely on general contingency reserves established during or since the war, hoping that these will be adequate to cover the rise in replacement costs. Some concerns have revised fiscal and dividend policies to provide funds for the purchase of equipment at inflated prices. The main point in any of these techniques, however, is that such action tacitly recognizes that costs are understated and profits are overstated to at least the extent of allowances necessary to provide for the rise in replacement costs.

Such methods, in the main, have been employed by larger manufacturers. U. S. Steel Corp. is reported[4] to have employed the first mentioned method during the first half of 1947, charging off an additional $12½ million on the grounds that present day costs of new facilities are higher than the original costs on which normal depreciation rates are based. E. I. du Pont de Nemours & Co. and Libbey-Owens-Ford Glass Co. likewise have adopted a policy of accelerated depreciation, although their techniques provide for the contingency of a possible reduction in present cost levels at some future date. Larger companies are in a position to take such action. Smaller companies, unless they have extremely accurate facility-life and replacement data over a period of years, are at the mercy of the tax examiner who will tend to read the regulations *out of the book*. These companies have neither the expert tax or legal advice nor the money to procure such advice for a battle with the Bureau of Internal Revenue in the Tax Courts. In consequence, the tax examiner dictates, as a rule, and the manufacturer pays.

Because many factors affect the useful life of any facility, an average life cannot be determined mathematically. The problem varies with almost every individual case. In addition to whether or not a machine will run after so many years, there are always to be considered the factors of obsolescence due to technological change, of the inability of the precision machine to maintain close tolerances, and of the ability of a machine to meet production demands. Advancement in manufacturing techniques during the war made many facilities obsolete. Furthermore, while many plants acquired new equipment during the war—enjoying a 60-month depreciation on it—others merely operated the machines that they already had harder and longer to produce war material. The useful life of this equipment was sharply reduced, and, while in rare instances allowance was made for this overtime use, the equipment now cannot be replaced at original costs recovered through depreciation allowances.

Accelerated depreciation would solve some, but obviously not all, of the tax problems of small business. Even the Treasury Dept., which only recently has shown the slightest sign of compromise in this matter, has admitted the seriousness of the plight of small business. In a recent Treasury Dept. report[5] aspects of a limited accelerated depreciation plan for small business and the equity and administrative issues connected with it were described. Broad revenue and economic problems associated with such a plan were not studied. However, the report stated, in part, that limited accelerated depreciation for a limited amount of assets would help small business finance capital outlays in manufacturing and other industries in which large amounts of depreciable assets are required. Risky and growing enterprise would be benefited especially. As a means of improving the accessibility of capital and of removing tax deterrents to risky investment, accelerated depreciation would be more effective than a reduction in tax rates costing the same amount of revenue.

"... We suggest that a rate set by taxpayers be considered prima facie correct so long as it is followed with some reasonable degree of consistency even though it fluctuates to a small extent from time to time."—Harold V. Bozell, Independent Telephone Companies Assn.

The findings of the study were summed up in the statement that accelerated depreciation for a limited amount of assets would help small business to finance capital outlays in industries in which relatively large amounts of depreciable assets were required. The one serious aspect of these findings is whether or not small business alone should be offered relief or whether the relief should be general in application. If it is to be limited to small business or any other specific segment of industry, it becomes in effect a subsidy and business would be tampering with a tricky explosive if it were to favor such limited relief. However, this study was limited to small business, so it may not reflect the Treasury's overall attitude on the subject.

While there is a widespread feeling that liberalized depreciation is advisable, THE IRON AGE wanted specific information on this question from metalworking companies and trade

and industrial associations in the metalworking industry. Consequently, top accounting executives and controllers, representing a limited but comprehensive cross-section of the metalworking industry, were polled. Their opinions were sought on various phases of this problem. Indicative of the interest in the subject was the fact that more than 42 pct of those polled responded. Such a response provided the means for a sound analysis of representative business opinion on the subject.

Graphic results of this survey are shown in the accompanying illustrations. A total of 72 pct of those responding indicated that present tax policies on depreciation are inadequate from the standpoint of their respective companies, while 97 pct favored liberalization of the federal depreciation policies. Such an overwhelming majority favoring liberalization of depreciation allowances, through revision of the tax laws, makes it reasonably obvious that some change is necessary if a long-range harm to industry is to be prevented.

The survey sought some indication of the form which a liberalized depreciation system should take. There was divergence of opinion on this point but 59 pct favored free depreciation. The tally showed that 12 pct favored a straight-line method over 10 years and another 8 pct favored a straight-line method over 5 years. Only 3 pct favored the diminishing balance technique. Free depreciation, i.e. full latitude to the taxpayer to set his own rates so long as the technique chosen is consistent, was most favored, polling 59 pct of the votes. It seemed to be the leading choice because it was felt that the manufacturer is a better judge of the rates properly applicable to his particular plant than a tax examiner or a revenue field agent. About 13 pct of the controllers favored a 25 pct writeoff during the first year with the remaining 75 pct to be written off by the straight-line method. The remaining 5 pct suggested other methods which were basically the 25 pct writeoff with variations as to the time limit on the 75 pct straight-line writeoff.

". . . Adopt in the Internal Revenue Code a provision which would permit the taxpayer an option to write off 25 pct of current capital expenditures as a current expense (deductible either in the year of expenditure or over a period of not more than five years). If a taxpayer elected such a writeoff, only the remaining balance of 75 pct would then be available to him to be written off by depreciation."—Henry B. Fernald, Chamber of Commerce of United States.

In this survey, the question was asked: "If a liberalized depreciation policy is incorporated into the new tax law, will it cause accumulation of 'hidden assets' and necessitate maintenance of an additional accounting system for municipal or state tax purposes?" If such were the case, the balance sheet of a company would not necessarily show the true worth unless depreciable properties were constantly re-evaluated. To this question, 21 pct answered "yes," 74 pct answered "no" and the remaining 5 pct indicated that they either didn't know or thought it possible.

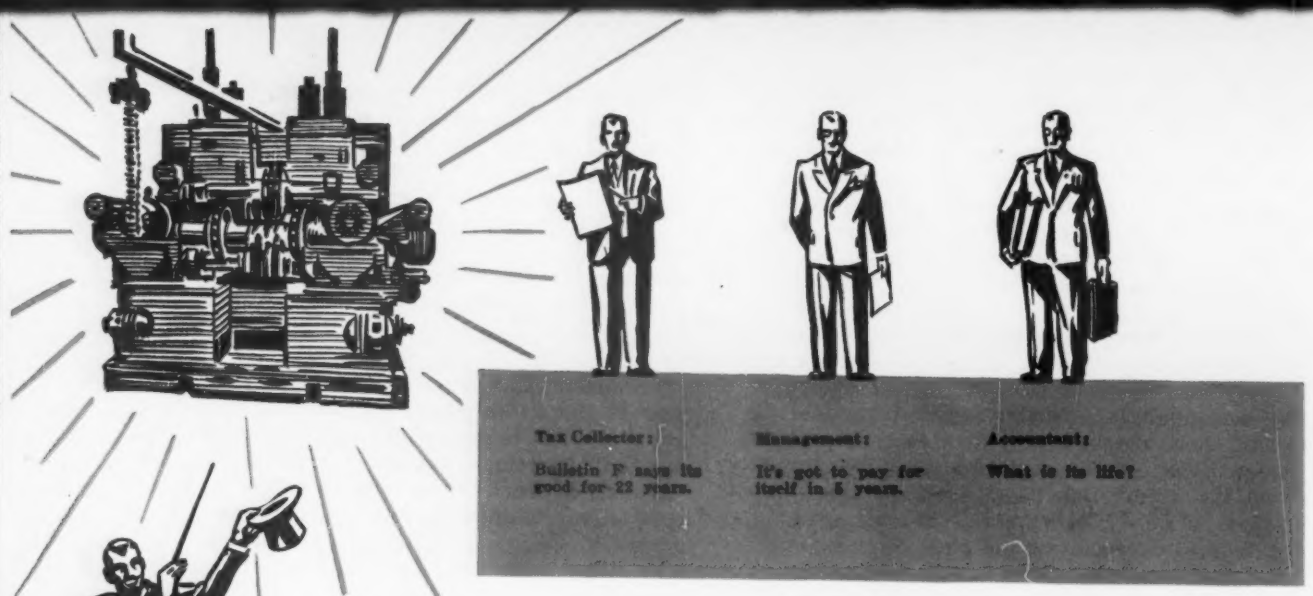
The Treasury's main objection to any plan of liberalized depreciation has been the immediate loss in revenue. There is, however, considerable question, even if free depreciation were instituted, whether or not there would be any wholesale radical departure from current procedures. The first tenet of business success is the establishment of sound, long-term policies. It is inconceivable that any large segment of American industry would indulge in unsound depreciation practices, employing excessive rates, merely because the law might permit it. Such a policy would combine present advantage with long-term disadvantage, and might well result in ultimate bankruptcy for the concern that employed it.

From the government's point of view, a major swing in the direction of free depreciation at high rates, to be sure, would cut into immediate returns from taxation, but any loss of revenue suffered in the earlier years would be offset fully by increased tax collections when the depreciation base on any asset has been removed. This, while evident, does not solve the immediate problem of revenue loss in the early years of such a policy.

Quite apart from the considerations of immediate loss, it is propounded that the stimulation to business and the increase in profits which would result from a far-reaching modernization movement among industrial plants inevitably would broaden the tax base. Thus, the effect of a liberalized depreciation policy, in the long run, would be to increase federal revenue from taxation with no corresponding increase in the tax rates. Far better it is that the federal budget be balanced by a wholesome growth in national income than through improper and undue levies on industry through the mechanism of inadequate depreciation allowances.

Congress is cognizant of the situation and may take steps this year to do something about it. What will be done is impossible to say, but the Capehart-Grant bill, introduced Dec. 4, 1947, at least gives evidence of Congressional recognition of the problem. As to this bill, however, many proponents of liberalized depreciation feel that, by granting accelerated depreciation on a 5-year basis, it is much too arbitrary and rigid. The advocates of complete

". . . We propose that the Internal Revenue Code be amended as follows: . . . The amount of the adjustment shall be the aggregate of the deductions heretofore taken which resulted in a reduction of the taxpayer's tax for any year to an amount less than that which would have been payable if the deduction of such amount had not been allowed for such year. The amendments . . . shall be applicable with respect to taxable years beginning after Dec. 31, 1938."—E. L. Grimes, Controllers Institute of America.



Machine or Magician?

latitude to the taxpayer in setting his own rates feel that many, for example, would not want to depreciate their assets as rapidly as the 5-year terms of this bill require. The prospective revision of the Internal Revenue Code offers the greatest hope of correcting depreciation inequities, and may take care of the situation.

The mass of opinion—even that of the Congressionally appointed tax study—favors liberalization of depreciation. In the Magill report,[5] recommendations are for some liberalization. The report states, "Internal revenue agents customarily contend that the taxpayer has fixed too short a life for the assets in his plant. They are reluctant to give much weight to obsolescence, or to wear and tear due to extra shift operations. Controversies also revolve around methods of depreciation; methods recommended by the taxpayer's auditors are not always acceptable to the Bureau's agents. Taxpayers frequently are put to heavy expense in supplying elaborate data to support the deductions which have been taken.

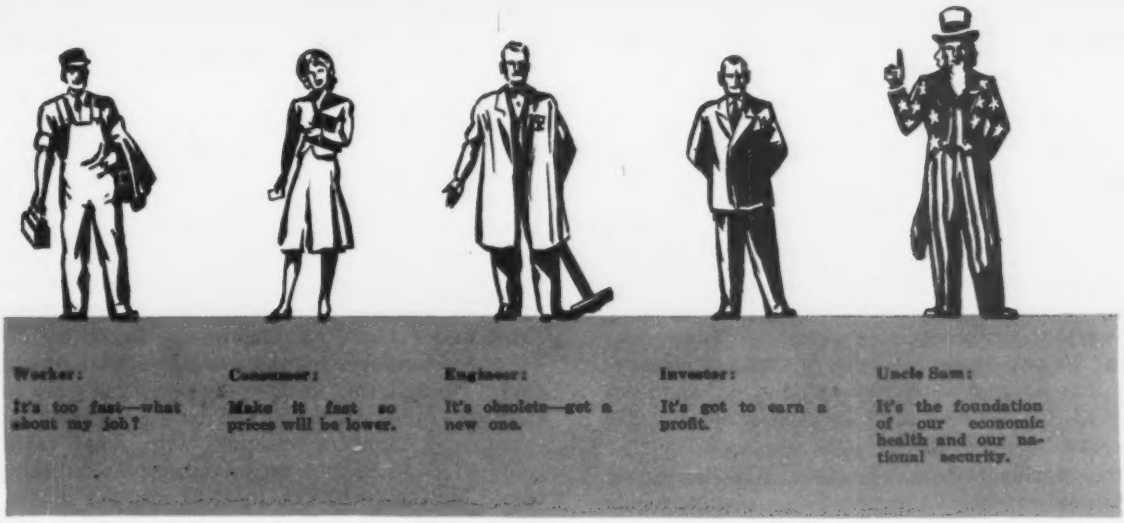
"Taxpayers and their auditors ought to be better judges of depreciation rates and methods than Internal Revenue agents because they are more familiar with actual operating conditions in their plants. Hence, we believe that there will be a net gain to all parties in the long run if the determination of rates and methods of depreciation is left, in general, to the taxpayer." The report further recommends that a manufacturer be allowed to utilize for tax purposes the same accounting procedure which he employs for managerial purposes.

Specific recommendations of the Magill report include: (1) For taxable years starting on or after Jan. 1, 1948, in cases of assets with a life of more than 5 years, a deduction shall be allowed for depreciation claimed by the taxpayer on his return, in accordance with the method of computing depreciation and the rate used in his books of account. To change the rate and method, once it is set, permission must be granted by the commissioner. (2) Depletion and depreciation in excess of the amount properly allowable should not be required to be deducted from the basis of property unless a tax benefit resulted from the excessive deduction.

Under established procedure, the taxpayer is required to reduce the basis of property, and hence future deductions are reduced by the amount of depreciation allowed as a deduction in prior tax returns. As the study points out, particularly during the depression years of the 1930s, excessive amounts of depreciation often were deducted because no action was taken on the return for the reason that the taxpayer had sustained a loss and no tax was payable anyway. Such excessive depreciation or depletion resulted in no tax benefit. The basis of the properties involved should be reduced only for the correct amount allowable.

In so many words, the Magill report endorses the free depreciation plan. By no stretch of the imagination can these recommendations be termed the biased opinion of industry, even though they represent what a large part of business would like to see. The study took into consideration the possible immediate loss in revenue to the Treasury Dept., and its recommendations were made despite this fact. Actually, these recommendations would have been made by far more representatives of industry, but less drastic liberalization policies were substituted because many feel that free depreciation at this time is a political impossibility.

It is likely that Congress eventually will make into law the joint recommendations of the Senate Finance Committee and the House Ways



and Means Committee, after some minor haggling over details. While congressmen cannot have a working knowledge of all phases of legislation coming before them, the lack of knowledge on this problem is somewhat appalling. In a poll conducted by THE IRON AGE of 127 members representing industrial areas, the response was very poor; but the returns which were received indicated that very few had any knowledge whatsoever of the problem. Some, politicians at heart, indicated that in a general manner they favored anything that encouraged expansion of industry and reduction of taxes. Some honestly admitted they knew nothing about the matter. One indicated that he definitely was opposed to liberalization of depreciation rates, would not support such a measure, and listed liberalized depreciation as the last method he would favor if tax reductions were possible next year. Several, while favoring liberalization of depreciation policies, placed individual income tax reductions as first choice if the tax burden could be reduced—an astute political recommendation and a sure vote-getter.

One congressman, with perhaps a better knowledge of this tax problem than the others, indicated that instead of straight-line, diminishing balance, or any consistent free depreciation method, he favored one which would "reflect value based on present costs." This same congressman stated that liberalized depreciation definitely should be included in the 1948 tax bill on the same basis as any other mechanism of tax relief.

Various associations and groups representing management in the metalworking industry have displayed particularly keen interest in the depreciation problem. Several participated in the House hearings. The most active proponents of accelerated depreciation among the groups representing metalworking plants are the National Machine Tool Builders' Assn. and the Machinery & Allied Products Institute. These associations are striving for accelerated depreciation not only because the problem affects their member companies, but often, to an even greater degree, it affects the buyers of their products.

Frederick S. Blackall, Jr., chairman of the committee on fiscal problems of the National Machine Tool Builders' Assn., has consistently supported free depreciation based upon the taxpayer setting his own rates and speed of depreciation and using it consistenly. Mr. Blackall is no novice in tax and managerial matters, being president and treasurer of the Taft-Peirce Mfg. Co., and a director of the Federal Reserve Bank of Boston. He maintains that TD-4422 should be withdrawn and that the taxpayer should be permitted to establish depreciation rates on any reasonable basis which covers his situation, provided he stick to those rates consistently. Further, Mr. Blackall emphasizes that the burden of proof as to the lack of reasonableness, if any, should be placed upon the Treasury Dept., rather than on the taxpayer, and that the factor of obsolescence in depreciation no longer should be ignored in this connection.

A little more sensitive to political feasibility is the Machinery & Allied Products Institute. In testimony before the House Ways and Means Committee, recently published in pamphlet form,[6] MAPI advocated another form of liberalized depreciation. By understating consumption of capital goods in the early years of their lives and overstating them during the later years, the report stated, there occurs a maldistribution of depreciation charges over the life span; with the cumulated sum of such charges lagging behind the cumulated capital consumption throughout the life span.

MAPI's recommendations are, first, that in any reform, the burden of proof with reference to depreciation rates should be placed on the Bureau of Internal Revenue. Whatever method of depreciation is elected, the taxpayer's judgment should stand except where the Bureau is able affirmatively to prove the method unreasonable. Second, it is recommended that "to avoid profitless controversy over the question of reasonableness, Congress should specifically authorize the depreciation of productive facilities by the customary straight-line method or its equivalent, over a period materially shorter than full service life. We suggest the authorization of any period

not less than two thirds of the estimated service life on the assumption, generally valid, that what is left of the value and usefulness of capital assets after two thirds of their life has expired is not worth haggling over."

This technique permits a liberalized depreciation policy without upsetting present administration techniques, yet compensates for the tendency of the straightline writeoff to lag behind capital consumption. MAPI points out that if all taxpayers were to take immediate and complete benefit of such a program, it would raise the present aggregate of depreciation allowances about 50 pct. However, it seems absolutely certain that no such universal switchover would occur and it is believed that such allowances would increase far less than 50 pct.

The National Founders Assn. likewise is on record as seriously objecting to present depreciation policies. It took official notice of the matter at its fiftieth annual meeting in New York this past November when it projected as one of its programs for the coming year the task of appealing for revised depreciation allowances.

Tool Shops Explain Problems

The National Tool & Die Manufacturers Assn., through its executive secretary, George F. Eaton, likewise is on record[7] in the House hearings as recommending accelerated depreciation. While Mr. Eaton's testimony tends to confuse liberalized depreciation with increased allowances for multiple-shift operation of equipment during the war, he projects the idea into future depreciation methods. He testified that "because of the extreme precision with which tool and die shops must work, machine tools and other equipment must be in the best of condition. Consequently, the useful life of the machine in a tool and die shop is not determined by its ability to operate, but rather by the period during which it can efficiently perform the precision work required."

The National Industrial Conference Board held a round table discussion[8] on the subject of accelerated depreciation, at which Paul T. Norton spoke on the economic justification of accelerated depreciation, and Roy Blough, assistant to the secretary of the U. S. Treasury Dept., discussed the problem of accelerated depreciation for tax purposes. Professor Norton claimed that our industrial economy would operate better if depreciation charges in the early years of the lives of assets were higher than now permitted. Higher depreciation allowances are not an unsound expedient to provide a tax incentive for investment. Current depreciation tax practice puts a dangerous brake on the operation of the industrial economy, and any single liberalized allowance such as a 33 pct writeoff during the first year and straight-line thereafter might have the effect of removing the brake in some instances but applying it even more severely in others.

Mr. Blough claimed that in 1933 it was found that depreciation was being charged off too rapidly, and it was recommended that it be cut arbitrarily by statute 25 pct for 3 years. On the subsequent recommendation of the Treasury Dept., that reduction in rates by field agents was a better approach, depreciation was tightened up administratively through TD-4422, issued in 1934. He claimed that if industry could have charged off more depreciation in recent years, it would have done so to save on income taxes at the rate of 85½ pct that which it would have lost later at a rate of only 40 pct. Further, he stated, if accelerated depreciation could be worked into the carrybacks, certain "companies could make a very nice thing of it."

"A good deal of interest in accelerated depreciation has been because it has been expected that tax rates would decline in the future," he claimed, "and under those circumstances, taxes can be saved the taxpayer by using accelerated depreciation." He felt that if free depreciation were instituted, there would either be a deterioration in sound accounting practices with great variations in depreciation rates, or else accountants would have to police themselves and set up machinery for the enforcement of sound procedures.

Mr. Blough claimed that there is great doubt as to the impetus which is given to investment by accelerated depreciation. Other factors limiting investments, such as the prospect of demand, the ability of industry to produce more and better products, production bottlenecks and the like, will have a greater effect one way or another than accelerated depreciation. It would accentuate investment in boom years and tend to stifle it in depression years.

Probably the most outstanding study of the depreciation problem is the Kimmel report[8], issued by the Brookings Institution, Washington.

In summary, he stated: "Because of the increased costs of capital replacements and additions, current depreciation allowances on assets acquired before the war generally do not suffice to cover equivalent replacements. Similarly, depreciation allowances for earlier years reflected in working capital have lost a substantial portion of their purchasing power.

"The problem arising from the higher level of costs can be solved — at least in part — by replacement reserves. Tax-free credits to such reserves should be allowed for 3 to 5 years. These credits would be in addition to the regular depreciation allowances; the maximum tax-free credit should not exceed one half of the depreciation allowance. It could be provided that when replacements are made, the replacement reserve might be charged with not more than one third of the cost.

"Under the policy of the Bureau of Internal Revenue adopted in 1934 the taxpayer has had a minimum of discretion in determining depreciation allowances. For many businesses the depreciation deduction has been the most troublesome of all items taken into account in determining tax liabilities. Proving the reasonableness of the deduction has been a cumbersome matter. Final tax liabilities have become more uncertain. The Bureau's policy may well have acted to some extent as a deterrent to capital expansion. Moreover, taking into account the entire period from 1934 to 1945, the change in policy probably did not increase federal income tax revenues.

"In determining depreciation allowances for tax purposes, appropriate weight should be given to the view of management as to what consti-

". . . The taxpayer should be allowed to take a reasonable amount of depreciation under a consistent method, which method may be changed upon approval by the commissioner. The method should not require a uniform rate for deduction. It should be aimed at the recovery of capital investment against taxable income during the period when it is economically possible to recover the investment. . . . Deductions claimed for depreciation or obsolescence by the taxpayer should be presumed to be allowable."—Paul T. Norton, professor of industrial engineering, Virginia Polytechnic Institute.

tutes a reasonable allowance. Since depreciation is indeterminate in nature, a strict policy is not warranted. Greater taxpayer discretion in depreciation allowances subject to appropriate limitations should be a principal objective of postwar tax policy. If more discretion is granted to taxpayers, it would help to stimulate replacements and new investments — especially in the more venturesome undertakings. The lag between technological improvements and their general adoption would also tend to be reduced. Greater taxpayer discretion in depreciation allowances merits favorable consideration by the Congress and the Treasury."

This Brookings study is something of a climax to a veritable avalanche of information and data supporting accelerated depreciation and is not inconsistent with the recommendations already described. Actually, there is little in support of present depreciation policies. There can be no question of the need for liberalized depreciation of capital assets, but the question hinges on the method to be substituted.

If the government in general and the Treasury Dept. in particular presupposes that they are designed to rule and determine the policies and destinies of industry, then the pleas of industry will be unheeded and laws and regulations can be made without respect to the needs of industry. However, with more than half of American metalworking plants favoring free depreciation and 97 pct of them claiming that there is a need for some form of liberalization of depreciation policies on the part of the government, it appears that action on the part of Congress is highly imperative. American business bears the brunt of the annual tax load, and, while reductions in individual income taxes may be far more popular and assure far more votes, some recognition should be given industry and business if for no other reason than the appalling implications of killing the goose that lays the golden eggs.

The hue and cry of the more vocal who pose as representatives of the American populace may protest such action, and their lobbies will carry a great deal of weight. However, despite the shortcomings of American industry — and it has shortcomings — the American people, if they want a nation that is strong and free, must keep in proper perspective the place of industry in their economy. It is this same industry that provides jobs, the necessities and luxuries of peace, the superior weapons of war, and the real wealth of the people. It was this industry that accomplished the monumental task of arming the United States and to a large extent its allies so adequately that in 5 years a war was won which military experts felt would take 10 years to win — if it could be won. Without those weapons, the bravest army in the world would have been a pushover.

In order to calculate true earnings accurately and get a more realistic perspective on the value of facilities, many companies now maintain one set of books for tax purposes and another to show their true corporate worth. If taxes must be based on one set of assumptions and the true value of an enterprise upon a second set, something definitely is wrong. It therefore seems imperative that Congress, in establishing a new Internal Revenue Code, should permit industry to depreciate its assets at those rates and over those periods that the individual taxpayer deems necessary for his business, with only such limitations as will insure against duplication of depreciation deductions. Further, as so often pointed out, the Bureau of Internal Revenue, in any question on a taxpayer's deductions for depreciation, should be made to produce positive proof that those deductions are unreasonable or dishonest. It is necessary to return to that fundamental tenet of American jurisprudence that a man is innocent until proved guilty. The taxpayer should be considered right until he is conclusively proved to be wrong.

In the final analysis, the problem becomes one of political expediency v. statesmanship. The present year is a presidential election year and a reduction in personal income tax, rather than a correction of depreciation rates, is the obvious political approach. It appears unlikely that a reduction in both income taxes and a modification of depreciation rates would be granted in the same year, for the momentary loss of revenue would be larger than present budget plans will permit. As a matter of fact, Washington observers list the probable order of precedence, so far as reduction in revenue is concerned, as (1) income taxes, (2) excise taxes, and (3) modification of depreciation rates.

The consensus, then, is that important action on depreciation rates is unlikely this year. Action in 1949 will probably hinge upon how effectively and emphatically industry is able to present its case.

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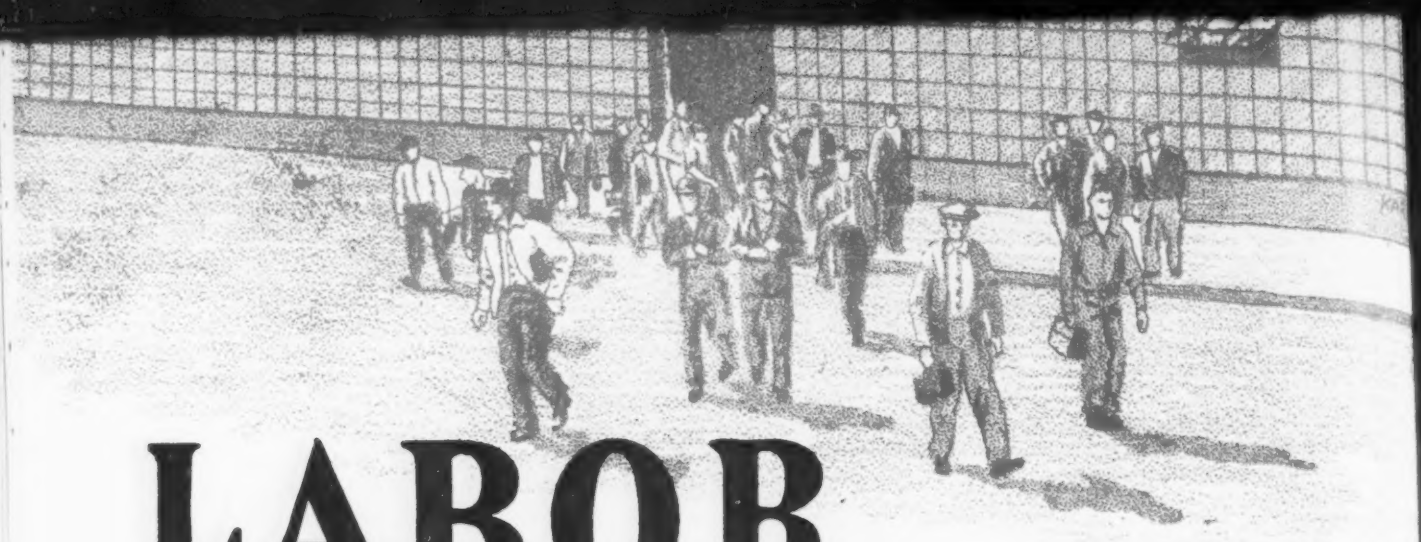


LABOR

1948-Peace or Pickets

By W. V. PACKARD
Associate Editor,
THE IRON AGE

THE National Labor Relations Board is the unhappy middleman in the gigantic tug-of-war which seems likely to take place between unions and management in 1948. NLRB has been placed in the unwelcome limelight by the highly controversial Taft-Hartley Act.

During most of 1947, while Congress was considering the act, and since it became law on Aug. 22, opponents and supporters of the act have kept their heaviest propaganda guns blasting almost constantly.

Labor leaders have bitterly referred to the act as the "slave labor law," "brutal law of injunctions" and "an instrument for union busting." Supporters of the act have just as vociferously insisted that it "corrects the injustices of the Wagner Act," "protects the rights of the workers," and "makes labor and management equally responsible."

But, so far, there has not been a showdown on any major provision of the act. The past year has been a period of sparring—a period during which charges and countercharges have been made in abundance, but during which both sides have effectively prevented a showdown. The sparring period appears to be rapidly drawing to a close. The opposing lines have been clearly drawn. The act will undoubtedly be tested severely during 1948.

• With the NLRB in the unhappy role of the middleman, the labor picture for 1948 carries all the overtones of a gigantic tug-of-war between unions and management over various phases of the Taft-Hartley Act. The part to be played by NLRB, and its controversial general counsel, is analyzed in this discussion, with emphasis on the board's likely attitude on such matters as the injunction, the anti-Communist affidavit, and the status of noncomplying unions.

The passage of the Taft-Hartley Act was not an accident. It was accomplished only after great deliberation by Congress, and, finally, over the veto of the President.

Supporters of the act insist that its main provisions are aimed at correcting the abuses which arose under the administration of the Wagner Act.

The cries of industry upon the passage of the Wagner Act in 1935 were not unlike the cries of labor upon the passage of the Taft-Hartley Act in 1947.

The Wagner Act came into existence because the conditions of the times demanded it. Social and economic developments in the nation

had brought the worker out of the "dark ages of the sweat shop," and he was rightly insisting that he should be permitted to bargain on an equal basis with his employer.

Unfortunately, however, a large segment of industry had not kept pace with these developments. A great many employers were still paying their workers wages which were totally inadequate to meet the higher standard of living these same employers had helped create. Speedups were the order of the day, with almost no attention at all being paid to the appalling conditions under which wage earners were compelled to work. But worst of all the employee had no recourse for his grievances.

The Wagner Act was designed to provide the worker with recourse for his grievances. It protected him from being discharged as a result of seeking higher wages or better working conditions. It gave a legal blessing to his long efforts to bargain collectively. It was a corrective measure—built to remedy the abuses of the time.

With the passage of the Wagner Act some industrial leaders insisted that it was unconstitutional; it was vicious; it deprived employers of long-established rights to conduct their business as they choose in all its phases. But it was not unconstitutional, and, except as it was abused, it was not vicious.

But labor, like management, is made up of human beings; both are subject to the same human frailties. It is not surprising that a substantial number of opportunists became labor leaders overnight. It is not surprising that the unions, in some instances, became the instruments of individuals who were seeking personal power.

The labor unions, engaged in the biggest organizing drives of all time, welcomed all prospective members with open arms. In the race for numbers, the unions didn't bother to ask prospective members whether or not they were Communists—doubtless some of them were.

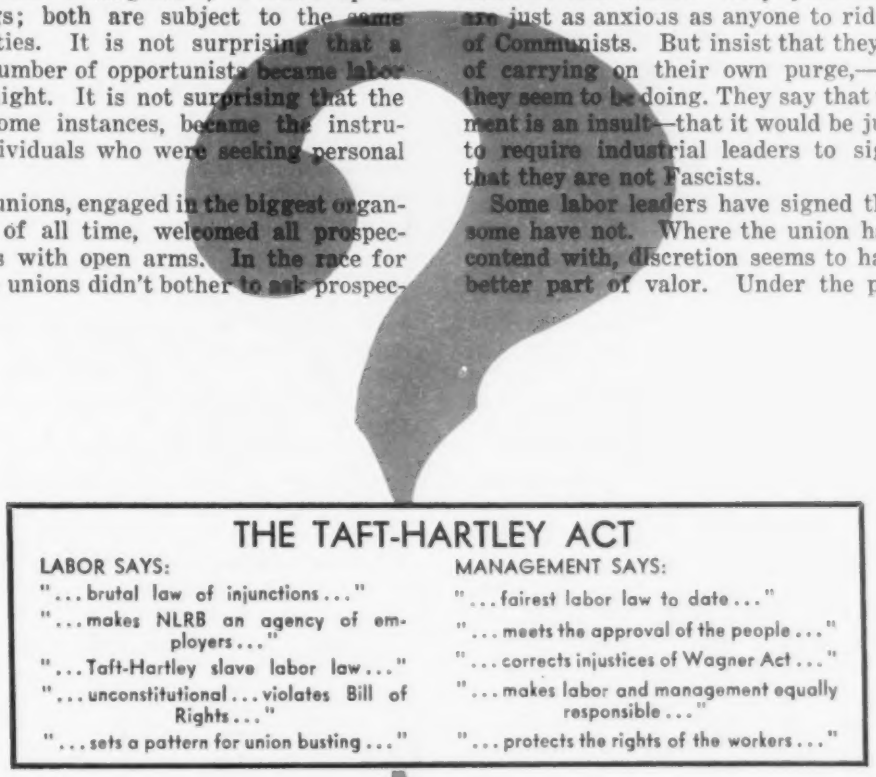
Abuses such as the sitdown strike, mass picketing and coercive tactics were employed by the opportunists under the protective cover of the act and under the guise of labor advancement. The individuals and unions who fostered these abuses were few. Yet the abuses occurred with sufficient frequency to build up a slowly rising tide of public indignation against the unions.

The stage was thus set for the passage of the Taft-Hartley Act. Proponents of the act insist that it was merely designed to remove the abuses which grew out of the Wagner Act. They state that it grants labor and management equal rights, as well as equal liability. But labor continues to view the act with bitter suspicion.

One of the most controversial parts of the act is that which requires union leaders to file affidavits attesting that they are not Communists. Failure to sign the affidavits makes it necessary for NLRB to bar the union from the ballot in an election to determine the bargaining representative of the workers. Failure to comply with the affidavit clause also bars the union from any right to initiate unfair labor practice charges against the company. Some union cases already have been thrown out by NLRB on these grounds.

Labor spokesmen are bitter in their resentment of this clause. They point out that they are just as anxious as anyone to rid their ranks of Communists. But insist that they are capable of carrying on their own purge,—as, in fact, they seem to be doing. They say that this requirement is an insult—that it would be just as logical to require industrial leaders to sign affidavits that they are not Fascists.

Some labor leaders have signed the affidavits, some have not. Where the union has a rival to contend with, discretion seems to have been the better part of valor. Under the provisions of



THE TAFT-HARTLEY ACT

LABOR SAYS:	MANAGEMENT SAYS:
"... brutal law of injunctions ..."	"... fairest labor law to date ..."
"... makes NLRB an agency of employers ..."	"... meets the approval of the people ..."
"... Taft-Hartley slave labor law ..."	"... corrects injustices of Wagner Act ..."
"... unconstitutional ... violates Bill of Rights ..."	"... makes labor and management equally responsible ..."
"... sets a pattern for union busting ..."	"... protects the rights of the workers ..."

the act, an election to determine the bargaining representative of the workers may be requested by the employee, by a union or by the employer. Since the NLRB must bar from the ballot any union which has not complied with the non-Communist affidavit clause, such a union could not possibly hope to be chosen as the bona fide collective bargaining agent in an election.

Steps in Test Case

One test case which has already been handled by NLRB aptly demonstrates this. The case might be outlined chronologically according to the following steps:

(1) After the passage of the Taft-Hartley Act the union refused to comply with the non-Communist affidavit requirement.

(2) The company then asked NLRB to conduct an election, ostensibly for the purpose of determining whether the workres still desired to be represented by the union.

(3) Since the union had not complied with the affidavit provision of the act, NLRB was forced to bar the union from the ballot.

(4) But no rival union asked to have its name placed on the ballot.

(5) NLRB then ruled that, since there were no qualified candidates, no election could be held.

(6) As a result of steps 1 to 5, the company has no continuing legal obligation to bargain with the union.

The above case also clearly indicates the precarious position in which a union that has not complied with the affidavit provision finds itself if there is a rival union seeking an opportunity to become the legal bargaining representative of a plant's workers.

Since the act also specifies that NLRB cannot hear unfair labor practice charges initiated by noncomplying unions, such unions actually find themselves in the position of having no occasion to do business with the agency. Several unions have already indicated that they will not attempt to do business with NLRB under the terms of the Taft-Hartley Act. One union has said, "We do not recognize the NLRB, except as an employer agency."

The end result might be that the overworked NLRB will eventually find itself not so busy, although this has not happened yet. In fact the number of cases charging unfair labor practices has been steadily increasing.

Such charges may be initiated by an individual, as well as by a union or an employer. If NLRB continues to throw out all cases initiated by non-complying unions, as, in fact, the law says it must, the agency might very well find its machinery hopelessly clogged with a multitude of individual suits. For every barred union charge, the board might find itself faced with hundreds of individual charges.

NLRB is just as obligated to hear the individual suits as it is to hear suits brought by unions or employers. While the number of charges brought by individuals is increasing, it has not yet approached the avalanche proportion of concerted action.

During 1948 NLRB machinery will either have less grist to grind, or it will clog as a result of an unprecedented load of litigation.

A total of 930 unfair labor practice charges have been filed since Aug. 22, when the law went into effect. But only a small percentage of this total will ever be prosecuted. The NLRB general counsel has issued 11 complaints of unfair labor practices. The issuing of a complaint, after investigation of a charge by the general counsel, may be regarded as an intent to prosecute. Ten of the 11 complaints issued by the general counsel have been directed against unions, while an employer has been declared the offender in only one complaint.

The summaries for November showed that 257 charges of unfair labor practices had been filed. Sixty charges were brought against unions, of which 42 were filed by employers and employer associations, 16 by individuals, one by an independent union and one by an affiliate of the CIO. Of 197 charges brought against employers, 98 were filed by individuals, 56 by affiliates of the AFL, 29 by affiliates of the CIO, and 14 by independent unions.

Unions won all of the 112 polls conducted to determine whether employees wished to work under a union shop, which requires that every employee must join the union within 30 days after he is hired. In these elections 90 pct of all ballots cast favored the union shop.

In November 1832 new cases of all types were filed with the board. This is an increase of 43 pct over the preceeding month. Of these new cases, 81 pct were requests for various types of elections.

Of the 2428 pending cases filed after Aug. 22, charges of unfair labor practices accounted for 930 and petitions for elections totaled 1498.

Strong Unions Fare Better

The stronger unions, or unions having no rivals for recognition as bargaining representatives, appear to be in a more favorable position to withstand the affidavit provision of the act. One such union is the United Steelworkers of America, CIO, which embraces 875,000 members. USWA has maintained a policy of aloofness toward NLRB ever since the Taft-Hartley Act became law. Philip Murray, president of the steelworkers' union, as well as of the CIO, has steadfastly refused to sign the affidavit. The union policy-making board has given Mr. Murray a vote of confidence in his personal stand.

Two weeks after Congress had overridden the President's veto of the bill the USWA policy-making board said in a resolution, "We denounce the new Taft-Hartley Act and the new labor board as instruments clearly designed to oppress unions and to destroy the living standards of American workers."

The present avowed policy of USWA is to attempt to reconcile any differences with employers through collective bargaining. Failing in this, the union has stated it will insist on its right to strike. The right to strike still prevails under the new law.

Despite the fact that USWA could not even get its name placed on a ballot in an election to choose a bargaining representative, no effort has been made to decertify it.

With the apparation of the third wage round

(THE IRON AGE, Nov. 27, p. 113) looming in the background, this might prove to be one of the hottest spots on the labor front during 1948.

Second only to the non-Communist affidavit clause in the amount of controversy it has created is the section of the act which makes the closed shop illegal. The act states that the closed shop, which provides that none but union men may be employed, is no longer permitted. The union shop, which permits an employer to hire anyone he pleases, provided he becomes a member of the union within 30 days of employment, may be incorporated in a contract only when that has been agreed to by the affirmative vote, in a secret election, of a majority of all the employees who would be affected by such a provision.

Under the terms of the act the union shop is not easy to obtain. In a union shop election it is not enough for the union to gain a majority of the votes cast. The number of votes favoring the union shop must represent a majority of those eligible to vote in the election. Under this system of voting, a worker who refrains from voting is in effect casting a vote against the issue.

Unions Don't Like It

Even though the union shop wins a majority of all eligible votes, it does not automatically become embodied in the contract which is finally signed by union and management. A favorable vote for the union shop merely makes it a legitimate item for negotiation. It may or may not be included in the contract as it is finally written. After the union shop has once been included in a contract the only time an employee may be discharged at the insistence of the union is when he has failed to pay his dues or initiation fees.

To say that this is obnoxious to some unions is putting it mildly. Labor complains that this deprives the union of all control over its membership—that it protects, not only those who have engaged in dual unionism, but those who menace the unions as informers, troublemakers in internal affairs and all others. They even claim that they could not effect the discharge of a Communist if they should find one in their ranks.

NLRB general counsel Robert N. Denham has warned employers and unions against the danger involved in negotiating a union shop, without first conducting an election among the employees. Mr. Denham indicated that there is nothing inherently illegal in such a contract, but that it does not provide either the union or the employer any protection. If the employer should discharge an employee at the insistence of the union for having lost his good standing with the union, even if it should be for nonpayment of dues, such a discharge would constitute an unfair labor practice. The employer could expect that if charges were filed he would be ordered to reinstate the employee. The employer or the union might be required to repay the worker for lost pay.

The Taft-Hartley Act has reversed the field of labor legislation by returning to the use of injunctions. As the act is written some practices demand that the general counsel petition the Federal District Court for an injunction; for other practices the injunction may be sought at the discretion of the board, or general counsel.

The filing of a charge alleging any of the following practices makes injunctive proceedings mandatory;

(1) Strikes, or other interferences with the orderly conduct of business, designed to force employers into trade organizations.

(2) Boycotts designed to prevent the processing of "hot" materials.

(3) Boycotts or picket lines to force recognition against some other employer who may not have employees of the picketing or boycotting union sufficient for certification.

(4) Strikes by a minority group of employees to force recognition, notwithstanding the existence in the plant of a certified union.

The filing of a charge alleging any of the above practices demands precedence in the office of the general counsel. The general counsel is obliged to quickly investigate the charges. If he feels that the facts are as alleged, he is compelled to go to the United States District Court with a petition for an injunction to restrain the union from continuing the practice.

In addition, the board may seek, at its own discretion, an injunction where any unfair labor practice has been charged and a complaint issued, in order to restrain the continuance of such unfair practices by the union during the judgment of the issues raised by the charge.

It is this portion of the injunction against which labor has shouted the loudest. They refer to it as "the brutal law of injunctions."

Although there is abundant evidence that many employers have attempted to frame their complaints against unions in such a manner as to bring them under the above category, the injunction has so far been used very sparingly. In fact the general counsel has stated that he will use injunction in labor disputes "only when violence is threatened or public welfare is at stake."

Sword of Damascus

But the unions are not satisfied with this assurance. To them the injunction is like the sword of Damascus, suspended by a thin thread of discretion over their right to strike. They have served advance notice that they will press the fight vigorously on this front in 1948.

The act also provides machinery for the settlement of jurisdictional disputes in cases where the parties involved are unable to reach an agreement. Where a strike has arisen from a jurisdictional dispute, a charge is filed against one or both of the disputing unions by an employer, or conceivably by some other person affected by the strike.

After the regional director is satisfied that a jurisdictional dispute actually exists, he notifies the parties involved that they have 10 days in which to settle the dispute among themselves. If the dispute is not settled within the allotted time, the board renders a decision. Refusal to accept the ruling of the board would bring a trial like any other unfair labor practice. Meanwhile, the general counsel may petition the United States District Court for a restraining order.

The act also outlaws the practices of featherbedding and the charging of exorbitant initiation fees and dues by unions. There has not been a great deal of controversy over these features of the act.

Another provision of the act is the Federal Mediation and Conciliation Service, which has taken over the functions of the former United States Conciliation Service. This service is provided for the purpose of assisting labor and management to reach agreements by means of collective bargaining.

The penal features of any law invariably receive all the publicity. This is true of the Taft-Hartley Act. Everyone concerned with the act has been so wrapped up in what employers and unions are permitted to do and what they are not permitted to do, that some of the most constructive features of the act have received little attention.

Collective bargaining is still the national labor policy of the government. Employers are still required to bargain in good faith with the representatives of their employees. Employee representatives are likewise required to bargain with employers.

In the cogent but vague words, "in good faith," rests the answer to the labor dilemma of 1948. True, Congress has made failure to bargain in good faith, either on the part of management or labor, an unfair labor practice. But this is not a matter for the court. Only the most flagrant violations of the good faith clause could be proved in court. Intent is always difficult to prove in court. In the absence of a direct statement of intent by the party in question, intent cannot be determined with any greater degree of exactness than the opinions of those who would judge.

Collective bargaining is a process whereby negotiators, who presumably approach the bargaining conference with divergent objectives, meet for the purpose of attempting to find a mutual ground of agreement. When persons of divergent views attempt to find a common ground for agreement, it is apparent that there must be changes of position. Proposals, counterproposals and concessions must be made, aimed at achieving common ground.

Failure to agree does not necessarily mean that the bargainers have not acted in good faith. But it might mean that the bargainers have not applied themselves in their task of seeking common ground with the utmost energy, using every conceivable means. No court will convict a bargainer of entering a conference in bad faith if it feels that he wanted to reach an agreement, but was conscientiously unable to do so.

Under no circumstances should collective bargaining be permitted to break down merely because the bargaining parties are unable to agree. The Federal Mediation and Conciliation Service has been made available for just such contingencies. The assistance of the service may be obtained upon the request of either management or labor. If the service feels that interstate commerce is being affected it may even proffer its services. However, the director and the service are instructed to avoid attempting to mediate disputes which would have only a minor effect on interstate commerce if state or other conciliation services are available to the parties.

If the director of the service is unable to bring the parties to agreement by conciliation within a reasonable time, he shall seek to induce the parties voluntarily to seek other means of settling the dispute without resort to strike, lockout, or other coercion. As a last resort the employer's last offer of settlement may be submitted to the employees of the bargaining unit for approval or rejection in a secret ballot.

Both the National Labor Relations Board and the Federal Mediation and Conciliation Service point to collective bargaining as the only hope for industrial peace. Good relations between labor and management are effected in the agreements reached at the conference table. They can never be made in the courts.

Repeated recourse to the courts can do more to breed deep-seated ill feeling than almost any other phase of employer-employee relationship. The facilities of NLRB are readily available to labor and management alike. But they should be used sparingly, when all efforts to settle differences have failed.

The fact that an unfair labor practice has been committed is not sufficient reason for litigation. The wrong should first be fully discussed at the conference table, and every conceivable effort should be made to reach an agreement. Only after all other methods of deciding the issue have been exhausted should the court even be considered.

Despite the tremendous barrage of propaganda fired by the publicity guns of labor and management regarding the Taft-Hartley Act, despite all the bitter words which have been exchanged pro and con, despite the maze of litigation, which has at times become so involved as to obscure real issues and real purposes, despite all these and more, the fundamental relationship between management and labor remains the same. Industry needs workers and workers need jobs. The price at which labor is to be bought or sold is still a

matter for collective bargaining. Collective bargaining is not accomplished in court. It is accomplished at the conference table.

If 1948 brings failure at the conference table, or if labor feels that litigation and injunctions are being applied indiscriminately, it will undoubtedly fall back on its time-tested weapon—the strike. If this happens, management, labor and the public at large will all be losers.

The brightest hope for peace on the industrial front is the continuing need for production. With the requirements of the Marshall Plan added to a domestic demand already in excess of existing production capacity, the need for production will be even greater in 1948. It is to the advantage of management and labor alike to prevent the tragedy of strikebound plants, which would permit the postwar market to slip into other hands.

In his recent message to Congress, the President recommended that "legislation providing for United States aid in support of the European Recovery Program authorize the appropriation of $17 billion from Apr. 1, 1948, to June 30, 1952." The President asked that $6.8 billion of this amount be appropriated for use from Apr. 1, 1948 to June 30, 1949.

Appropriation of the funds necessary for this vast program of aid is the task of Congress, but the production of the physical goods which these funds represent is, and will continue to be, a joint task for management and labor.

While it has been estimated that the Marshall Plan will amount to only about 3 pct of the national income during the life of the program, its impact on the domestic economy will be many times greater. At a time when sizable amounts of domestic production are being shipped to the 16 European nations, additional effective demand will become manifest in the form of additional purchasing power by those who produced the goods which were shipped abroad.

As 1947 draws to a close it becomes increasingly evident that most postwar production goals were too cautiously made. On all fronts the clamor is for more and more goods at lower prices. The impact of the Marshall Plan can only magnify the present distortion between supply and demand.

In the absence of technological progress that is both immediate and revolutionary, the goal of more goods at lower prices can only be achieved through increased productivity brought about by management and labor working together.

During 1948 most production goals will need to be revised upward. The company or union which points smuggly to comparisons of 1947 production with prewar years, is engaging in wishful thinking which will prove harmful to its own best interests, as well as those of the economy at large.

The market for peacetime products, both at home and abroad, is unprecedented. It seems certain to continue at record breaking levels for at least 4 years. Seeking to meet the demand of this market is not only good business, but it is also a fascinating challenge to the productive ingenuity of American industry and labor. In this pursuit good relations between management and labor are an indispensable requisite. The companies and unions which recognize this and work in harmony toward common goals will establish themselves as leading contenders for the biggest sweepstake in the world.

SIT DOWNS: The alternative in labor-management relations is shown in these two widely differing scenes. On the preceding page, police are removing a picket line of the sit-down variety. At the lower right, labor and management are shown agreeing at the conference table.

METAL FINISHING

By ADOLPH BREGMAN
Consulting Engineer
New York

• Despite the nerve-wracking struggle to meet the unprecedented demand for the sturdy, gay finishes of a civilian life in the face of such major obstacles as continued material shortages and scarce skilled workers, the metal finishing industry in 1947 recorded many noteworthy achievements. Important additions to the fundamental knowledge of plating processes put new emphasis on the potentialities of engineered finishes.

SINCE the end of the war, the metal finishing industries have traveled a winding and, for many stretches, a rough road. Peace brought with it an immediate resumption of demand for the decorative finishes—bright polishes and gay colors. Peace did not, however, immediately provide the necessary materials. Many have remained in short and even critical supply, such as cadmium (which is still short but easing) and chromium and caustic soda of which there is a desperate need.

Nor did peace bring back the skilled polishers who had gone into the armed forces or war plants; they evidently found other better, easier and/or more lucrative trades. As a matter of fact, literally hundreds of them opened small polishing and plating shops of their own, flourished while the going was good, and are now dropping out like the leaves in autumn. At this time, however, there is still a shortage of good polishers.

Nevertheless, in spite of the sharp and expected swing back to the brighter, decorative, but thinner civilian finishes, as opposed to the dull, heavy war finishes, a strong undercurrent of utilitarian, engineering or industrial finishes is clearly apparent, which is proceeding quietly without fanfare, but in steadily growing volume.

An excellent summary of engineering applications for electrodeposited coatings has been compiled by M. B. Diggin, technical director of Hanson-Van Winkle-Munning Co. Electrodeposited coatings are used for engineering purposes because they impart to the metal or nonmetal being plated, certain physical properties not possessed by the base material. In many cases, the properties of both the base and the plated coatings are necessary for the proper functioning of the device. In other cases, the choice is dominated by economic considerations. For example, electroplated metals are used in forming articles which, because of their intricate shapes, would be difficult and costly to produce by conventional methods.

Deposits of various metals used for engineering purposes are generally, although not necessarily, thicker than those used for decoration or corrosion protection. In the early days of electroplating, before accurate control methods and other critical factors had been studied and evaluated,

emphasis swings to utilitarian finishes

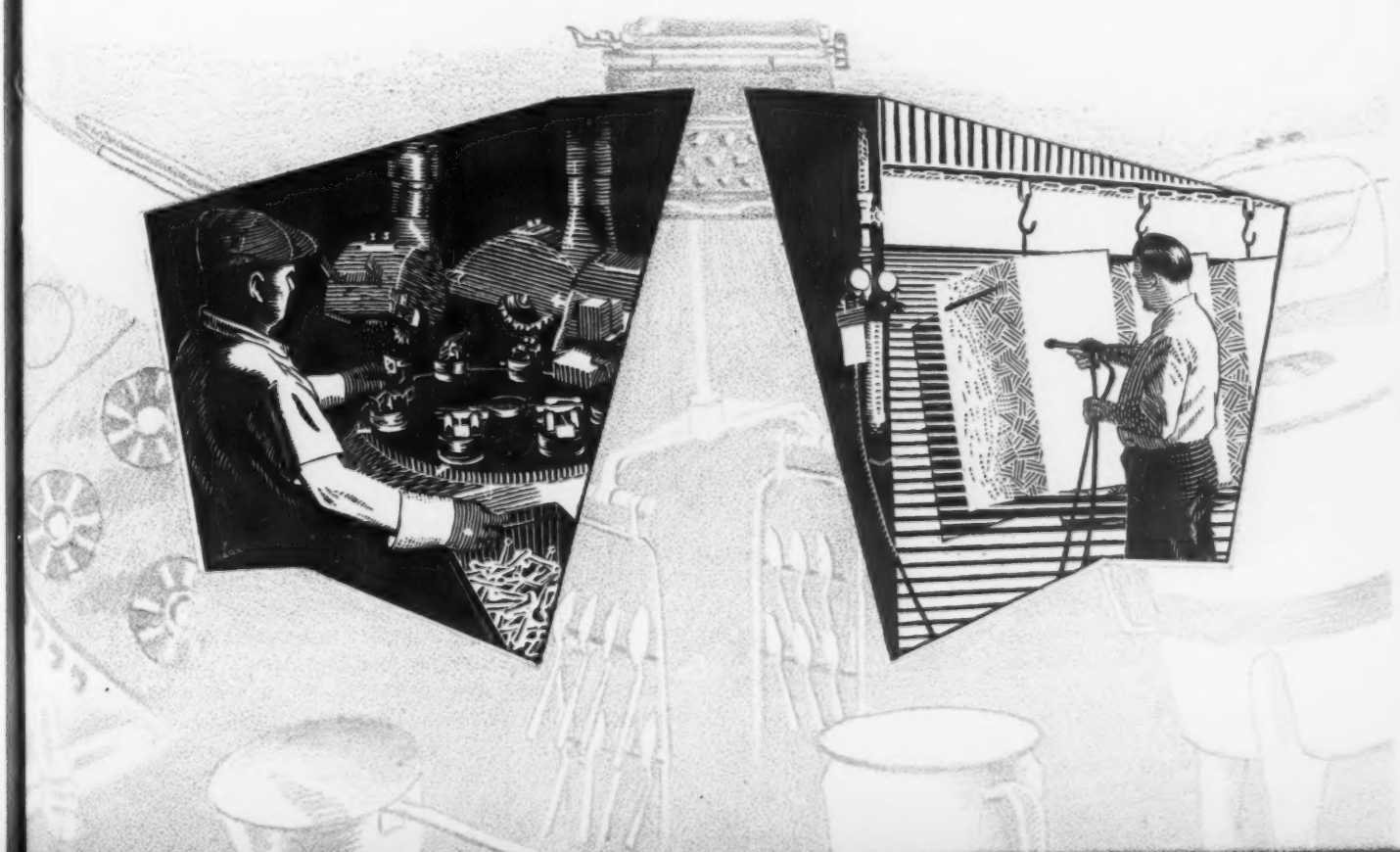
there was little, if any, assurance that the deposit would have a strong bond to the base upon which it was applied, or the required physical properties. Today, with the scientific knowledge available, the engineer can select a process to produce electrodeposits with known physical properties, ductility, elongation, hardness, porosity, adhesion, thermal and electrical conductivity, machinability, etc. These physical properties can, in most cases, be varied over wide limits and controlled closely. It is for this reason that engineers are turning to electrodeposition.

Chromium plate is widely used for molds, drawing dies, spinning tools, broaches, milling cutters, saws, drills, caps, reamers, shears, files, etc., as well as for dies for molding plastics. Chromium also has a large field in ordnance, as for lining machine gun barrels. Additional uses include facing rolls for cold rolling metals, calendering rolls, textile printing rolls, screens, stereotypes, electrotypes, phonograph record stampers, etc. In general, chromium plate is applicable to any use in which wear is involved.

An interesting and growing type of hard chromium deposit is the porous chromium used on cylinder walls in diesel engines in which the porous deposit holds the lubricating medium, reducing the contact area of the sliding parts with consequent reduction in friction.

Without doubt the most interesting, if not the most promising, use of electrodeposits for industrial purposes is electroforming, which may be defined as the electrodeposition over the surface of a mold or matrix to a thickness of approximately 0.010 in. or more and subsequent removal of the mold from the plated shell. It has also been called cold casting, or the manufacture of articles or shapes by electrodeposition. This unique process is a new tool which, placed at the design engineer's disposal, makes possible the simplification of many construction problems.

Nickel also has a variety of uses in industry,



many of them similar to the industrial or hard chromium, such as for phonograph records, printing plates, stereotypes, etc. Industrial nickel is also used for electroforming articles which would be difficult or expensive to fabricate by mechanical methods, including metal screens, duplex metal wave guide assembly for radar, Venturi tubes, molds for casting plastic shapes, molds for tire sections, rebuilding worn or mismachined parts, etc. Nickel is also applied as a lining to steel pipe for the chemical industry, plating plastics and impregnated wood parts such as airplane propellers, to improve abrasion resistance and to eliminate warpage which might be caused by moisture absorption. Other uses include bonding layers in the cladding of dissimilar metals (as silver-lined aircraft bearings), nickel-plated steel wire as a substitute for solid nickel alloy lead-in wires in electric light bulbs, as a cement or matrix for holding diamonds in the manufacture of small diamond abrasive wheels and as a sealer and protector for the cuprous oxide film on rectifier plates.

Copper plate is used for record stampers and electrotype plates, steel rolls for rotogravure printing and the production of sheet copper directly from a copper sulfate electrolyte (Electrosheet). This product is used for barriers against moisture and rot and is available cemented to strong paper backing.

Electrodeposited copper is also used for electroforming a wide variety of articles such as fine screens, clock faces, drills, plumbing fixtures, musical instruments, Pitot tubes, etc.

Other industrial uses of copper include coating the bottoms of stainless steel cooking utensils to improve heat conductivity; coatings for radio transmitters, chassis frames and antennae; coating iron magnets in domestic watt-hour meters; coating steel wire for reducing friction in drawing operations; coating articles for selective carburization in heat treating; for the production of metallic powder; coating aluminum for facilitating soldering; covering silver-backed mirrors for protection and covering plastics to prevent moisture absorption.

Electrodeposited tin coatings or copper-tin alloy coatings are used for protecting selected areas in nitriding operations. Tin is plated on cast iron pistons for automobile engines. Brass is used for a bonding layer in the application of rubber to steel. Iron is used in a manner similar to nickel in electroforming, salvaging, and to some extent in the graphic arts industries; also for graining plates to impart a surface detail to leather, impregnated fabrics, rubber, etc.

Silver, rhodium and copper-tin-zinc alloy deposits are used for coating reflectors.

The most striking industrial use of electrodeposits during the past few years has been the silver bearing for airplane engines with an overlay precision plate of lead and indium.

The trend toward engineering aspects of electroplating is still further evidenced by some of the work done during the past year. The physical properties of electrodeposited chromium[1] were described by Abner Brenner, Polly Burkhead and Charles W. Jennings of the National Bureau of Standards. The following data were obtained on a large number of deposits, produced under various plating conditions: Hydrogen and oxygen contents, hardness, density, tensile strength, Young's modulus, ductility and electric resistivity. The effect of heat treatment up to 2190°F on some of these properties was determined. In addition, observations were made on the cathode current efficiency of plating and on stress in the deposits as plated. The chromium deposits plated at elevated temperature were found to be much sounder mechanically than the bright deposits produced at about 125°F.

A similar study is also in process, "Physical Properties of Electrodeposits"[1] (AES Research Project No. 9) by Abner Brenner and C. W. Jennings of the National Bureau of Standards, on which a report is expected during the coming year.

The significance of stress in electrodeposits[1] was made clear by K. Gustaf Soderberg and A. Kenneth Graham of Graham, Crowley & Associates, Inc. A portion of the total stress is often of thermal origin (bimetallic strip action) but this is usually small compared with the total stress. "True" internal stress is believed to be tied in with high metal over-voltage phenomena.

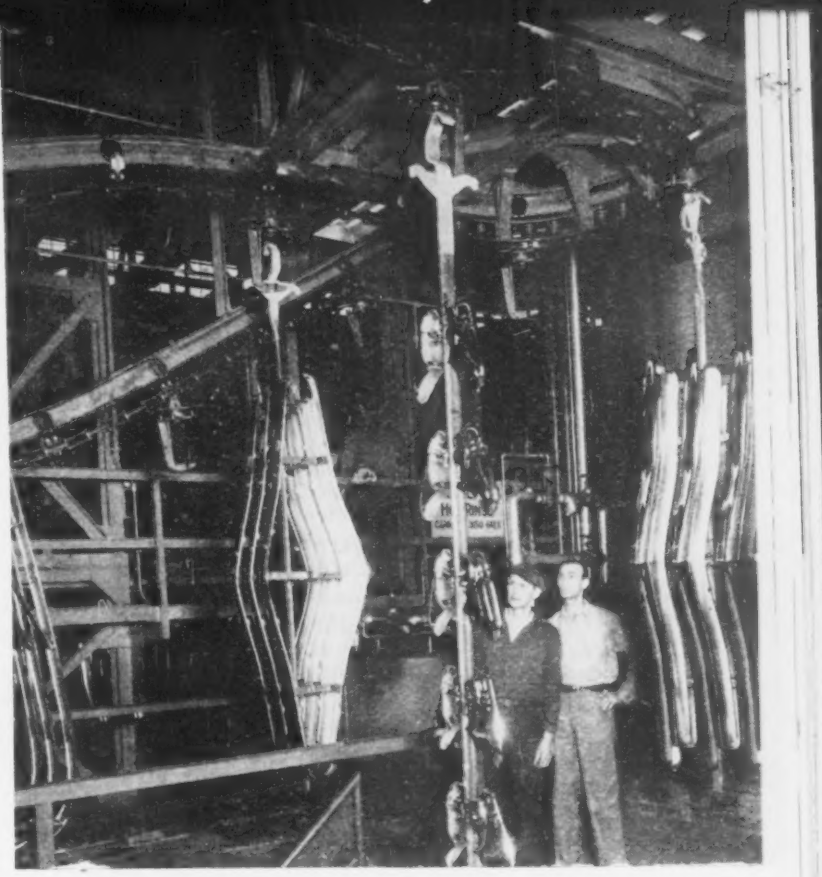
The authors found minute cracking in nickel deposits on outdoor exposure test panels with and without preliminary copper coatings. These fine check cracks have in the past been considered pores in the coating. The configuration and the

A COMPARISON of the finish produced by a new electropolishing method announced in 1947. Spoon on left has a normal buffed finish; center spoon is as-plated, before polishing; spoon on right has been electropolished by the new process.

size of the cracks were found to depend upon the properties of the base metal and the cleaning procedure employed on preliminary buffed copper coatings. Since the stresses in the nickel deposits were of lower magnitude than their tensile strength, the mechanism of cracking is believed to be one of stress corrosion or of stress concentration at imperfections in the coatings.

W. M. Phillips and F. L. Clifton of the General Motors research division did a study on stress in electrodeposited nickel[1] to increase the resistance of plated coatings to cracking in service. Internal stress by itself and in connection with assembly and service-introduced stresses was studied. Particular attention was paid to the ductility of the coatings, which largely controls the effect of the stress.

The engineering point of view of metal finishing was also clear in the following papers published during the past year: "Standardization of Buffing and Preparation of Atmosphere Exposure Test Panels,"[1] by C. C. Cupps, Standard Steel Spring Co., and A. Kenneth Graham, Graham, Crowley & Associates, Inc.; "Evaluation of the Buffability of Nickel Deposits,"[1] by R. O. Miller, Electric Auto Lite Corp., and A. H. Du Rose, Harshaw Chemical Co.; "Protective Power and Porosity of Electrodeposits"[1] (AES Research Project No. 6), by N. Thon, Princeton University; "Effect of Surface Finishing of Non-Ferrous Base Metals on the Protective Value of Plated Coatings,"[1] (AES Research Project No. 4), by George J. Kahan, U. S. Time Corp.



VIEW of one of the lines of what is believed to be the largest plating installations under one roof. Installed in an automobile plant, it was put into operation in 1947.

It has been found, through the years, that many of the multifarious and variegated defects and ills to which electrodeposits are the heirs, are caused by impurities in the deposits which come often from impurities in the solutions. Consequently, considerable work was done on this subject, the most important being covered in the following papers. "Sources of Impurities in Electroplating Solutions,"[1] by Myron B. Diggin, technical director, Hanson-Van Winkle-Munning Co. Impurities in electroplating baths may be classified as:

(1) Inorganic impurities in solution.
(2) Organic impurities in solution.
(3) Solid and dispersed impurities.
(4) Gaseous impurities.

Another phase of the impurity problem was discussed in the paper "Continuous Electrolytic Solution Purification,"[1] by C. E. Heussner and L. M. Morse, Chrysler Corp. While the presence of impurities in plating baths was at one time ignored and later tolerated, bath purity is now recognized as a serious problem which is closely tied in with stress, ductility, and service life of the electroplate. The value of continuous electrolytic bath purification in the production of deposits of uniformly good quality has been repeatedly demonstrated in plants supplying Chrysler. This paper described such a method of purification, presenting some of the history of its development and the principles involved in its use.

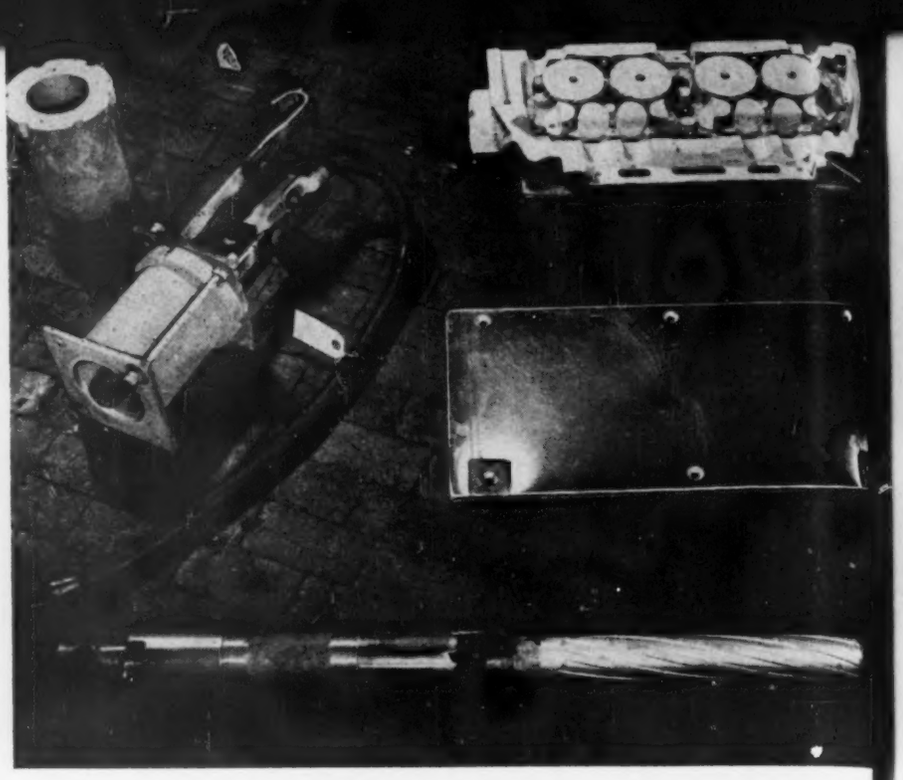
"Modern Applications of Electroplating Solution Purification,"[1] by B. C. Case, Hanson-Van Winkle-Munning Co., was another contribution to this subject. The paper contained much badly needed engineering data for the construction and operation of purification systems with old as well as new installations.

Other discussions of interest include "Extraction Methods Applied to the Analysis of Electroplating Baths and Determination of Zinc and Other Impurities in Nickel Solutions"[1] (AES Research Project No. 2), by E. J. Serfass and W. S. Levine, Lehigh University, and "Some Effects of Copper in Nickel Plating Solutions"[1] (AES Research Project No. 5), by D. T. Ewing and William D. Gordon.

A problem of growing importance in the electroplating industry is the disposal of waste. Local health authorities are beginning to cast a jaundiced eye upon plating plants which discharge cyanide solutions, strong alkalies and acids into streams and sewers. This problem has been attacked under the Research Program of the American Electroplaters' Society.[1] The National Assn. of Metal Finishers, Inc., has appointed a committee to study the subject. Also the use of limestone beds to neutralize waste from acid dipping and pickling operations was described[2] by A. L. Reidl of the General Electric Co. A unique system of upflow limestone beds is utilized in this method. The system prepares the effluent for dumping into city sewers and eliminates the need for acid pumps. It has proved to be an effective and economical means of neutralizing the acid reacting wastes resulting from acid dipping and plating operations at General Electric Co.'s Philadelphia works.

Other work of interest carried on during the

year includes: "Evaluation of some of the basic aspects the latter paper examined Methods for Determining the Thickness of Electrodeposited Coatings,"[1] (AES Research Project No. 7), by Harold J. Read, Pennsylvania State College; "General Consideration of Experimental Methods for Determining Polarization,"[1] (AES Research Project No. 8), by A. L. Ferguson, University of Michigan; "Deposition of Nickel and Cobalt by Chemical Reduction," by Abner Brenner and Grace Riddell, National Bureau of Standards, and "Metal Distribution from a Plating Bath,"[3] by J. B. Mohler and H. J. Sedusky, Cleveland Graphite Bronze Co. Distribution of metal from a plating bath is a subject that fully deserves the increasing attention being devoted to it. The authors of the latter paper examined some of the aspects of metal distribution and explained some of the factors affecting current distribution, throwing and covering power, polarization, plating range and current density, particularly as they influence plating quality. A table of plating ranges for common baths was also given.



A GROUP of typical hard chrome plated parts turned out by an automobile maker. The parts include a blow-out plate, a water jacket test fixture, a sleeve die and a Moline bar.

New Processes and Equipment

Electropolishing continues to be one of the promising fields of electrochemistry. In a paper on "A New Process for Electropolishing Silver,"[4] by Daniel Gray, Oneida, Ltd. and S. E. Eaton, Arthur D. Little, Inc., a new process was described which greatly simplified finishing operations on silverware. The expensive hand buffing operation ordinarily required to bring electrodeposited silver to a satisfactory smoothness and luster is reduced to a minimum. In some cases this operation is entirely eliminated and the electropolished articles go directly to the light final buff used to give the desired finish or patine to the surface. The cost of polishing a typical article may be reduced by 50 pct, it was stated. The quality of articles is also improved by this process. Line stripping is reduced and the finished articles have more silver on than when buffed.

An outstanding contribution to electrodeposition is embodied in the announcement of a new process, "Periodic Reverse-Current Electroplating"[5] by George W. Jernstedt, Westinghouse Electric Corp. By this process, polishing costs are reduced markedly while at the same time the plated deposit shows superior qualities of strength, elasticity, density, and freedom from flaws such as porosity. It consists of a novel plating cycle in which plating current is reversed briefly at short periodic intervals to deplate unsound and inferior metal deposited in the previous plating period and builds up many microscopically thin increments of sound metal to make a deposit more dense and of greater homogeneity than that possible with conventional continuous-current methods.

The equipment consists of an electronic time-contactor unit with a range of a fraction of a second to 25 sec for each portion (anodic and cathodic) of the time cycle.

An interesting development was a plating barrel for chromium as described[6] by G. Dupbernell and S. M. Martin, United Chromium, Inc. The new barrel is an open-ended horizontal cylinder, with a bare steel inside surface and an insulated outside surface. A very deeply serrated lead anode is placed inside the cylinder during plating and swung out of the bath after plating so that the cylinder can be removed for emptying. Vigorous agitation is used to maintain the desired bath composition inside the cylinder. The speed of rotation of the cylinder is very low in order that the parts stay in electrical contact with the inside steel surface at all times.

The silicofluoride-type chromic acid bath is employed, the sulfate type having too narrow range for uniform coverage of many parts. Not only decorative chromium coatings but also much heavier deposits have been applied in this equipment.

Considerable expansion has taken place in the use of selenium rectifiers for electroplating, with several new makes on the market.

In metal polishing, there is much activity in liquid compositions. A number of preparations are now available, for coloring nickel, brass, copper, aluminum and zinc diecastings. They clean up well on the work, leaving the face of the buff soft and clear and do not clog fluid lines. Spray equipment for applying the compositions to the wheel is now generally obtainable.

A new departure in full automatic plating equipment was embodied in a machine[7] designed for high speed plating by the General Electric Co., Philadelphia. The purpose of this machine is "spot plating," coating limited areas of large

pieces of work at high speed, using very high current densities. The machine consists of a steel cabinet with all controls mounted on two front doors which can be opened for inspection and adjustment, and a bracket placed at a convenient point to receive the various plating fixtures required to carry on this type of work and localize the plated surface. The fixtures also hold the work so that the plating solution is channeled over the surface of the part and returned to the tank, and to insulate the part from the machine proper which causes the work piece to act as the cathode and the machine as the anode.

Nonmetallic Finishes

The trend of new finishes in 1947 was like that of 1946, for still faster curing and higher temperatures with still better color retention.

The use of vinyls both in solution and dispersion form made good progress during 1947. In reference to vinyls, the organosols and plastisols attracted the most attention. They are extremely finely divided particles of vinyl chloride acetate resin (VYNV) suspended in a nonsolvent. In the case of the "organosols" a petroleum hydrocarbon is the nonsolvent. The principal features regarding them are their very high solid content, in some instances as high as 85 pct. After application a continuous film is obtained by raising the temperature sufficiently high to fuse the particles. This is usually accomplished by heating for a minute or two at 350° to 360°F.

Increased solids content has also been found advantageous in the air-drying nitrocellulose lacquers, using low-viscosity nitrocellulose and improved methods of application.

Another new class of finishing materials that gained increased notice and importance during 1947 was the silicone resins. These resins are unique in that they are a combination of inorganic and organic compounds that have unusually good resistance to high temperatures. In the lubricating field they have been widely adopted for use in high temperature resistance lubricating oils and their high temperature resistance is slowly being adapted for use in the protective coating field.

Advances have also been made in protective coatings made from polyester resins, styrene copolymers and epi resins during 1947.

In general, the largest advances during the year were made in improving the gloss, color, color retention, chemical resistance and heat resistance of the established finishing materials.

Summary and Prospects for 1948

Technically, the trends of the metal finishing industry in 1947 and prospects for 1948 may be stated briefly as follows:

(1) Continued extension of the engineering applications of electroplating: Electroforming, resistance to corrosion, mechanical abrasion and wear, and reclamation of worn and mismachined parts by building up.

(2) Continued investigation and research into the physical chemical and electrical properties of electrodeposits to provide the designing engineer with data for specifying the proper metal deposits for industrial and engineering applications.

(3) Continued investigation and research into the methods, materials and supplies used in metal finishing.

(4) Continued work on safe and adequate methods of waste disposal.

(5) Promising features of metal finishing:

a—Periodic reverse current electroplating
b—Electropolishing
c—Barrel plating chromium
d—Liquid compositions for polishing metals

As to the prosperity of the industry — the author will venture a prediction only if he is presented with an absolute guarantee of the future of American industry. Metal finishing rests upon metal products manufactures. Metal products rests upon our national consumer and industrial purchasing activity. Our national purchasing activity rests upon—and there we pass the buck to Higher Authority!

Emphatically, however, we are optimistic. The industry is obviously technically and commercially alert, alive and growing in depth and breadth, going deeper into its old fields and spreading into new. For years it has been threatened with "extinction" by stainless steel and plastics. We do not deny or underestimate these threats; they come from powerful competitors. We have only two answers:

(1) We are still here.

(2) We shall still be here in 1948 and perhaps for a year or two more!

References

[1] Paper presented at annual meeting of American Electroplaters' Society, Detroit, June 1947.
[2] Chemical Engineering, July 1947.
[3] THE IRON AGE, July 17, 1947.
[4] THE IRON AGE, Apr. 10, 1947.
[5] Metal Finishing, February 1947.
[6] AES annual meeting, Detroit, June 1947; see also THE IRON AGE, Aug. 21, 1947, p. 77.
[7] Materials and Methods, November 1947.

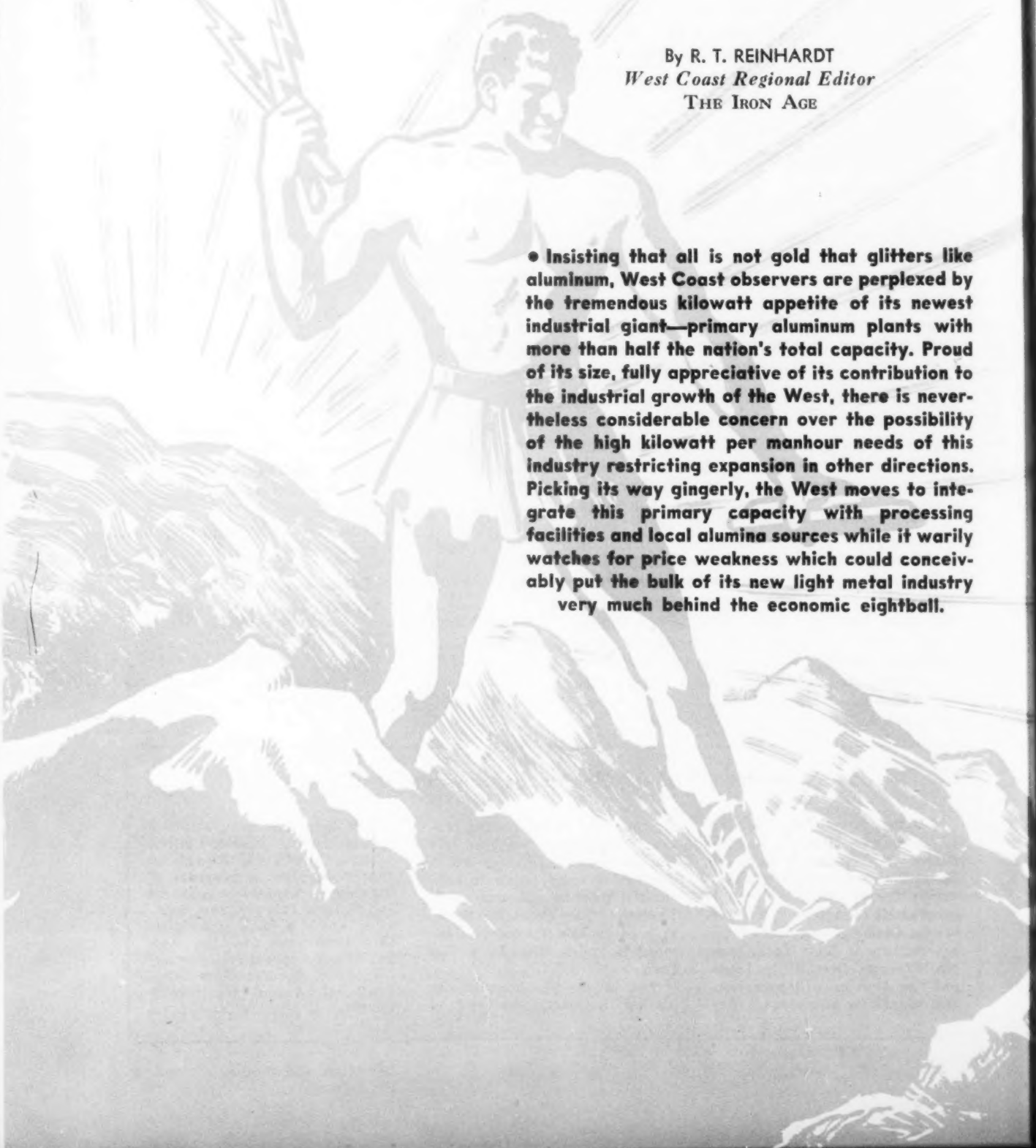
Metal Finishers Group Expands in Six Cities

The new organization of the job or contract electroplating industry, the National Assn. of Metal Finishers, Inc., swung into action during 1947 and made substantial progress. It now counts among its members local associations in New York, Boston, Chicago, Detroit, St. Louis and Los Angeles, with numerous individual firm members all over the country. An interesting program of activities has been laid out for the coming year which will undoubtedly result in substantial gain in size and effectiveness. The executive secretary of the association is Raymond M. Shock, Dime Bldg., Detroit.

One of the problems of the plating industry, shortage of skilled help, has been attacked by the Masters' Electro-Plating Assn. of New York, through an apprentice plan; a program of training for apprentice polishers and platers. This program, operating under a joint apprenticeship committee and the New York State Apprenticeship Council, covers Greater New York, Long Island and Westchester County.

The NEW GIANT

By R. T. REINHARDT
West Coast Regional Editor
THE IRON AGE



• Insisting that all is not gold that glitters like aluminum, West Coast observers are perplexed by the tremendous kilowatt appetite of its newest industrial giant—primary aluminum plants with more than half the nation's total capacity. Proud of its size, fully appreciative of its contribution to the industrial growth of the West, there is nevertheless considerable concern over the possibility of the high kilowatt per manhour needs of this industry restricting expansion in other directions. Picking its way gingerly, the West moves to integrate this primary capacity with processing facilities and local alumina sources while it warily watches for price weakness which could conceivably put the bulk of its new light metal industry very much behind the economic eightball.

of the west

IS THE primary aluminum industry of the West a watt-sucking vampire absorbing power at the expense of other industries which would support more manhours of labor per kilowatt, or is it a pregnant source of great development? That is a question being mulled over by many West Coast industrialists and economists.

Electric power is as necessary to aluminum production as is coke to the smelting of iron. A pool of millions of kilowatts of low cost power in the Pacific Northwest was the principal lure which brought about the development of five primary aluminum reduction plants in that area, with a total capacity of 316,000 tons of metal per year. Production in these plants is now at the approximate rate of 285,000 tons per year, or about 54 pct of the total United States capacity at the present operating rate of about 518,740 tons per year.

Every pound of aluminum produced in the Northwest requires from 8.6 to 9.4 kw-hr, and with an annual production capacity of approximately 316,000 tons, it is apparent that this power drain of approximately 5,700,000,000 kw-hr is something about which to be concerned.

The power situation in the Pacific Northwest today differs greatly from that which prevailed before the war when the Bonneville Power Administration was out searching for ways and means to sell the apparent abundance of electricity produced at Bonneville and Coulee Dams. The primary aluminum production plants are taxing all generating units of the area to the limit, and the once great reserve of electric power has disappeared to the point where steam generating plants are working at capacity and still all power demands cannot be met.

Authorities of the Bonneville Power Administration are happy to see this heavy demand which justifies the tremendous investments made in hydroelectric power plants in the Northwest. The present situation can also be used as a strong argument in favor of the construction of additional dams. However, there are industrial leaders who question the concentration of power use in one industry in which the kilowatt-hour consumption of electricity is disproportionately high in relation to wage earner-manhours.

It is estimated that at this time the primary aluminum production plants of the Northwest are utilizing about 814 kw-hr per wage earner-manhour. In contrast, textile manufacturing uses 5.4 kw-hr per wage earner-manhour; iron and steel industries and their products utilize 5.3 kw-hr; chemicals, other than rubber, utilize 18.7 kw-hr; cement and lime industry utilizes 44.3 kw-hr; aluminum products, including rolling, drawing and extruding, utilizes 7 kw-hr; and even primary smelting and refining of all nonferrous metals utilizes only 94 kw-hr per wage earner-manhour. These figures are reported by the Bureau of Census of Manufacturers for 1939, and there is little reason to believe they have changed materially since that time.

As long as this heavy drain continues on the power reserves of the Northwest, economists point out there is but little chance to develop those industries which utilize but small amounts of electricity in relation to total employment and that such industries are being kept away from the area to the detriment of business as a whole.

Regardless of individual opinion, it is the fact that primary aluminum production is an important industry in the area and so long as aluminum brings a price of approximately 12¢ a lb or better, it is believed that the industry is there to stay.

All three producers of primary aluminum are represented in the Northwest. All are dependent upon distant sources of alumina, the basic material which is reduced in electrolytic cells. Aluminum reduction plants in the West are:

Mead, Wash. Built by the Aluminum Co. of America for the Defense Plant Corp., and put into production in May 1941, this unit has a rated capacity of approximately 109,500 tons of aluminum per year and requires 1,944,000,000 kw-hr. It has six potlines, five of which are in operation and the sixth inoperative because of a lack of power. This unit is leased by the Permanente Metals Corp. from the WAA, and at present there are 912 employees. Entire pig production from this unit is utilized at the Trentwood, Wash. rolling mills of this same company. Postwar production costs are estimated at between 8.817¢ and 9.332¢ a lb. The present operators have not revealed their costs, but it is believed that these figures may have been shaved somewhat and may now be 9¢ or slightly less.

Tacoma, Wash. This is the smallest of the

Northwest aluminum reduction plants and the most recent to come back into production after closing soon after the end of the war. It was built by Olin Industries, Inc., for the government and is one of the two DPC plants in the Northwest utilizing the Soderberg process. The capacity is approximately 20,000 tons of pig a year and power consumption 369,000,000 kw-hr at capacity. This unit was purchased by the Permanente Metals Corp. for $3 million and another $1 million was invested in improving the operation. The first potline was started Nov. 12, 1947, and the second was put into production Nov. 28, and there are now 250 employees. This unit has the dubious distinction of having had the highest cost of production of any of the DPC plants in the Northwest with estimated postwar costs of 10.016¢ to 10.531¢ a lb. It is believed that with the improvements and changes made in the operations these figures will be brought down comparable to those at Mead.

Primary Aluminum Producers

Vancouver, Wash. This plant was built by Aluminum Co. of America in 1940 and is owned and operated by Alcoa at this time. The capacity of this unit is approximately 85,000 tons of pig per year, requires 1,548,000,000 kw-hr, and employs 1100. Postwar production costs are estimated at from 7.960¢ to 9.598¢ a lb.

Troutdale, Ore. Built by Alcoa in 1942 for DPC, this plant is considered extremely modern and efficient and has four potlines with a production capacity of 70,500 tons of pig per year with a payroll of 800. It is now under 5-year lease to Reynolds Metals Co. and reportedly is working at capacity. It consumes approximately 1,269,000,000 kw-hr a year. Production costs here are reported at from 8.530¢ to 9.254¢ a lb.

Longview, Wash. This plant was built by Reynolds Metals Co. and put into operation in September 1941, with an annual capacity of 31,000 tons of pig per year production by the Soderberg process. It was closed down in the middle of 1947 with the explanation that the company had a sufficient backlog of aluminum to make operation of this plant unnecessary. During operation, the unit employed 481 persons and consumed approximately 558,000,000 kw-hr a year. Production costs of this independently-owned operation are not available, but it is believed by competent authorities that cost per pound approximated 9.6¢. Reynolds officials recently stated the plant would reopen in 1948 if power becomes available.

Lack of sufficient electrical power has already doomed the two California aluminum reduction plants operated during the war.

The $24 million plant built by Alcoa for the DPC at Torrance near Los Angeles was promptly shut down at the close of the war, and all efforts to dispose of it as an aluminum producer have failed. The power company will give no assurance of supplying the heavy demand necessary and the cost of power would make the operation noncompetitive. This unit had a capacity of 89,000 tons of pig a year and required 1,602,000,000 kw-hr. Industrialists and city officials in southern California were unanimous in working for the closure of the plant as an aluminum producer in order that the available power might be distributed among other small industries with higher payrolls per kilowatt consumption. The plant and equipment has been frozen by the government and has been turned over to the control of the joint Army-Navy Machine Tool Program.

A similar fate has befallen the reduction plant at Riverbank near San Francisco. This unit was built by Alcoa for the government to produce 48,000 tons of aluminum pig per year and has been offered for sale but without any takers for the same reasons which make the Torrance plant a white elephant. Power is both scarce and expensive for aluminum production in this area, and the plant is now frozen and reportedly will be maintained by the government in standby condition or else placed under the security clause which would make it mandatory that it be ready for production of aluminum again on 30 days' notice. Since it is doubtful if such use will be made of the plant, it is believed it will be put under wraps until there is a crucial need for additional supplies of pig and cost is no object. At full capacity, Riverbank demanded a power supply of 864,000,000 kw-hr.

Among industrial leaders of the West who have hoped the production of aluminum pig would result in new industries with large payrolls, the rolling mill operated by Permanente Metals Corp. at Trentwood, Wash., is the fair-haired boy.

Mill Leased to Permanente

This modern aluminum rolling mill was built by Alcoa for DPC in 1942-43 and Alcoa operated it until November, 1945, for the primary purpose of supplying aluminum sheets to the expanded aircraft industry. Shut down at the end of the war, the facility was leased to Permanente Metals Corp. in February, 1946, and it was in operation in June of that year producing at nearly the rated capacity of 144,000 tons of plate, sheet and strip per year.

At the present time the unit is running at capacity with approximately 2000 employees turning out 12 different alloys. During the war the payroll was 3000, and the bulk of production was concentrated on three alloys. It is believed that cost per pound of rolled products has been materially reduced under the present management, but there are observers who are skeptical of the ultimate fate of this operation which must overcome high freight rates to reach the eastern market which now consumes an estimated 80 pct of its capacity.

It is also worthy of note that under wartime operations this plant produced sheets averaging 0.070-in. thick, as against the present average thickness of 0.040 in.

The equipment and operating methods at Trentwood are considered the most modern in the country. There are 38 reverberatory furnaces from which ingots weighing approximately 2500 to 3500 lb are cast, ranging in size from 10x32x85

in. to 8x42x105 in. There is a 120-in. primary breakdown mill where three to seven passes are made to produce a slab approximately 3 in. thick by 12 to 17 ft long. The next step is a 112-in. reversing mill in which the slab is broken down to approximately 1 in. in thickness with an average of three passes and is side sheared and cropped.

The slab next goes to the 80-in., five-stand continuous mill, where thickness is reduced to approximately 0.1 in. in a strip 400 to 500 ft long. The material is coiled and annealed and rolled to final gage on four-high 66-in. cold mills. Trentwood has three of these mills, two of which are single stands and the third a tandem unit.

Acquisition of the German aluminum foil plant, which is being dismantled for shipment and installation at the Trentwood mills, will considerably broaden the scope of products and be of material benefit in taking up some of the slack when the demand for sheets declines. This will be the only aluminum foil mill west of the Mississippi River, and it is believed a considerable portion of its production can be disposed of in the West.

It is understood that production of aluminum foil in the German mill will begin with 5-in. thick ingots which will pass through two hot breakdown mills, five reversing cold mills and 48 finishing mills which reduce the thickness of the sheet to 0.000315 in. It is stated that reduction to 0.00017 is possible with the equipment now in process of dismantling for shipment to the Northwest. Efforts are being made to put this mill into production early in 1948 and unless freezing weather interferes with shipment by barge in Europe, it is estimated that the first foil will be produced before the fall of 1948.

Another potential use for the primary aluminum produced in the Northwest is a mill to turn out aluminum rod, bar and wire at the Trentwood plant of Permanente. It is reported that Permanente engineers are seeking the necessary machinery to make these products, but no figures are as yet available on the amount of aluminum to be used in this operation.

There are only three other major consumers of pig aluminum in the West. These are Reynolds Metals Co. at Phoenix, Ariz., Harvey Machine Co. of Los Angeles, and Aluminum Co. of America at Vernon, Calif.

The Reynolds operation at Phoenix is confined to extrusions and a large part of its production at the present time consists of aluminum pipe. Since this company took over operations of the plant last year, it has been operating at approximately one third of capacity and it is anticipated that by Jan. 1, 1948, this will be stepped up to about 75 pct capacity. At that time approximately 1700 tons of extrusions will be produced per month. Rated capacity of the operation is 28,500 tons per year. Increase in the rate of operations is reported as being attributable to activity in the oil fields and construction. Present payroll is approximately 1000.

A comprehensive report on the development of the steel industry on the West Coast was published in THE IRON AGE, *Jan. 2, 1947, p. 121. In this present article, another important factor in the growth of industry in the West—the aluminum industry—is explored.—Ed.*

SILO for alumina storage dominates this scene of the stock yard at Permanente's Spokane aluminum reduction plant.

The plant built during the war by Bohn Aluminum & Brass Corp. for DPC is now under lease to Harvey Machine Co., which is utilizing it for the production of machine parts of various kinds. This unit includes some of the largest extrusion presses in the country and has a capacity of approximately 6500 tons a year. This independent operator purchases aluminum ingots on the open market. Present payroll is between 300 and 400 men. The plant, built for the government at a cost of approximately $8 million, is under lease for 5 years with the rental based on a percentage of the plant's net earnings. Under the management of Bohn Aluminum & Brass Corp., the plant made an enviable war record, producing aluminum rods, tubes and bars for delivery to aircraft manufacturers on an hour-to-hour basis.

Alcoa's operation at Vernon, Calif., which was started in 1938, turns out aluminum extruded shapes, forgings and pressings, drawn tubing, rivets, commercial ingot, sand and permanent-mold castings, and magnesium sand and permanent-mold castings. Wartime annual capacity of this plant as reported by the U. S. Government was: extrusions, 17,880 tons; drawn tubing, 3600 tons; forgings, 6750 tons; sand castings, 1800 tons; permanent mold castings, 600 tons. This is a total of 30,630 tons of aluminum products per year.

Employment at this time approximates 1040 and production now varies from the above figures according to demand, although operations are reported at a high level. Incidentally, it was re-

West Coast Primary Aluminum Producers

Location	Operator	Annual Capacity Tons	Employees
Mead, Wash.	The Permanente Metals Corp.	109,500	912
Tacoma, Wash.	The Permanente Metals Corp.	20,000	250
Vancouver, Wash.	Aluminum Co. of America	85,000	1110
Troutdale, Ore.	Reynolds Metals Co.	70,500	800
Longview, Wash.	Reynolds Metals Co.[1]	31,000	481
	Total	316,000	3553
Torrance, Calif.	Not operating[2]	89,000	....
Riverbank, Calif.	Not operating[3]	48,000	....

[1] Temporarily not operating. Expected to reopen this year if adequate power available.

[2] Built by Alcoa for DPC. Still held by DPC for sale.

[3] Built by Alcoa for DPC. Still held by DPC for sale. Expected to be maintained by U. S. as standby for emergencies.

cently announced by Alcoa that the company has ceased taking orders for aluminum sheets, which of course it does not roll on the Coast, until early 1948.

Alcoa has recently announced plans for an aluminum wire, rod and electric transmission cable plant which will probably be built near the present Vancouver reduction works. It is understood that some machinery will be transferred to this new location from other plants and new equipment will be installed to supplement the old. It is expected that this unit will utilize a large percentage of the production of the Vancouver primary producer. It has been intimated by Alcoa officials that before the plant to produce wire, rod and cable is located at Vancouver, there must be some additional assurance of a continued supply of power for the primary producer at the present rate of consumption at least.

In addition to the above mentioned consumers of aluminum pig, there are about 100 aluminum foundries which consume relatively small tonnages, producing castings for the aircraft, truck, agricultural equipment, toy, boat, household appliances and construction industries.

Consideration of the above figures of operable capacity and potential maximum consumption indicates that the West is capable of producing at least 80,000 tons of primary aluminum over and above the approximate 236,000 tons per year maximum consumption.

The unfortunate situation which exists in the Northwest, whereby the alumina must be shipped from the East, the alumina converted to aluminum, and the bulk of the raw or semifinished material shipped out of the area, creates an unbalanced and unnatural economy which may be difficult to maintain in a normal market period.

At present it is believed that the major portion of Northwest aluminum production is going outside of the area for fabrication, and competent observers state that it is doubtful if more than half of the Northwest reduction capacity of 316,000 tons is being cast or fabricated out here now.

It is generally believed that power costs in the Northwest are considerably lower than elsewhere, and hence it is natural for aluminum reduction to take place there. However, it is a fact that either because of lower power costs in the East or the proximity of eastern plants to the alumina sources and to their largest market, Northwest plants cannot be competitive with eastern capacity. These factors are believed to have been important in the decision of Reynolds Metals Co. to cease production in 1947 at its Longview plant.

Some eastern producers of aluminum are in a position to reduce costs by 0.5¢ to 1¢ a lb of aluminum production because of a lower power rate. To this penalty on Northwest producers must be added approximately 4½ mills a lb for the cost of shipping alumina to their reduction plants, as compared to the most favorably located plants in the East; and Northwest plants are also penalized to the extent of having to pay up to 0.3¢ a lb more for delivery of the metal to eastern markets than do the more favorably located eastern plants.

It is generally conceded that with an increasing demand the position of the Northwest producers becomes more favorable because eastern production capacity is probably at its peak and expansion there is prevented by the present lack of additional sources of low cost power. It is reported that the scarcity of power is retarding the eastern capacity of Alcoa to approximately 240,000 tons, as compared with a capacity of 328,000 tons in the same plants during the war when power cost was of no consequence.

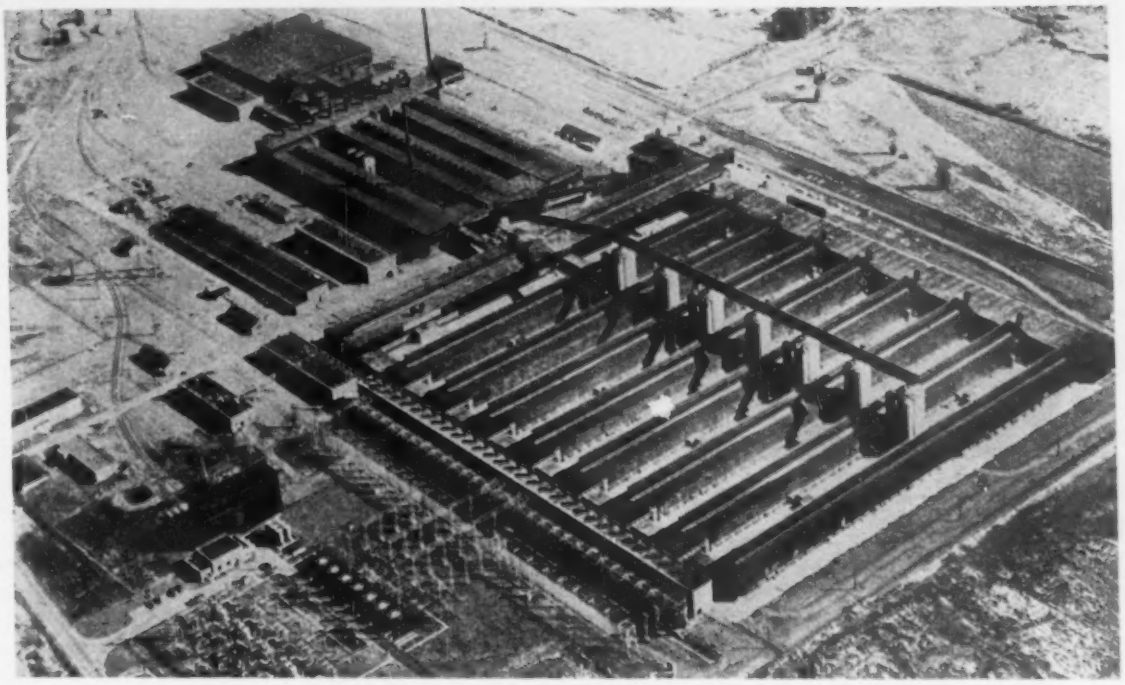
Eastern Production Costs Lower

When all factors involved in the production of aluminum such as labor, alumina, power, cryolite, aluminum fluoride, carbon, etc., are considered, it is interesting to note that production costs at most of Alcoa's eastern plants are lower than at their Vancouver, Wash. plant. It is estimated that the lowest cost producer of Alcoa is at Badin, N. C., where the range is estimated to be from 7.555¢ to 9.250¢, or an average of 8.4025¢ a lb, whereas at Vancouver it is estimated to be between 7.960¢ and 9.598¢, or an average of 8.779¢.

Reynolds presents a little different picture in that at its Jones Mills, Ark. plant, where power must be generated by diesel engines, their total cost a pound is estimated to run between 8.150¢ and 9.721¢, whereas at Troutdale, Ore., the cost per pound is estimated at from 8.53¢ to 9.254¢

It becomes apparent that in general the future expansion of the light metals industry in the Pacific Northwest is dependent upon government policy in regard to increasing power development in the area. Dams recommended by the Bureau of Reclamation will go a long way toward increasing the availability of power at, or near, the present rate of $17.50 a kilowatt-year.

In 1937 when TVA made its first contract with Alcoa for prime power at a rate of 2.74 mills per kw-hr at 100 pct load factor, and later contracts



PRIMARY aluminum plant of Reynolds Metals at Troutdale, Ore. Its annual capacity is 70,500 tons yearly.

at a rate of 3.42 mills on the same basis, this was believed a new low. However, in 1939 Alcoa made the first of several contracts with the Bonneville Power Administration in the Pacific Northwest, which gave them a rate equivalent to 2 mills per kw-hr at 100 pct load factor.

It should be noted that Alcoa has sold its power plant at Niagara Falls to the Niagara Falls Power Co., effective in 1949. It had been generating power there at a cost reported not to be in excess of 1.5 mills per kw-hr. Alcoa's Niagara reduction plant will be shut down and the company will probably rely on its Northwest capacity to fill this gap in its production.

According to the Federal Power Commission and the Bonneville Power Administration, national production of aluminum required 16½ billion kw-hr at peak production in 1943, of which 4½ billion came from Northwest generators. In 1946 it is estimated 7½ billion kw-hr were used nationally, of which about 2½ billion were produced in the Northwest.

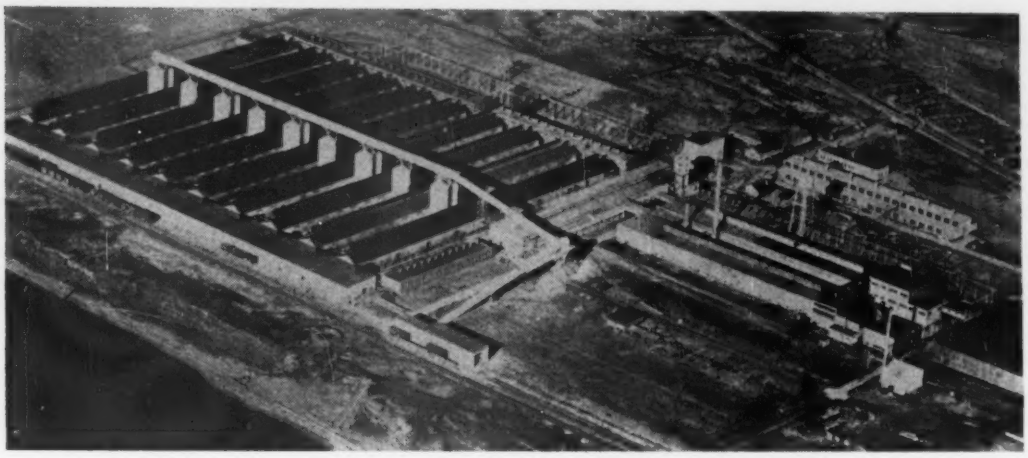
Producers in the Northwest are banking heavily on a steadily increasing domestic market for aluminum of all kinds which has grown disproportionately to the market for other metals. In 1939 there were 163,545 tons of primary aluminum produced in this country and in 1946 this figure was two and a half times as great, or 410,000 tons. It is reported that sales in 1939 were 225,000 tons and in 1946 the figure was approximately 757,000 tons.

It is conceded that with rising consumption and a limitation on production in other parts of the country, the Northwest plants have an excellent chance of survival. Whether aluminum can hold its own after steel becomes more readily available is a debatable point. Unquestionably, many fabricators who have gone to aluminum because of the dearth of steel sheets, will continue to use the former material since the additional cost of the raw material is offset by ease of fabrication or because its lightweight may be a selling point for the fabricated product. It is believed that aluminum for roofing and siding in building construction will continue to make inroads on galvanized steel. Here the lightweight of the metal, its high reflective characteristics which improve its insulating qualities and its resistance to corrosion make it a natural. Whether the cost differential will ultimately defeat aluminum is problematical, as during the current sheet shortage aluminum fabricators have had an excellent chance to make some noteworthy installations which have attracted favorable attention of builders and the general public.

Producers of aluminum in the Northwest have an ace in the hole which may go a long way toward making them more favorably situated competitively than eastern producers. It is known that there are large deposits of clays and laterites in Washington and Oregon with an alumina content which it is believed justifies their exploitation. Experiments now under way by Alcoa are said to provide considerable encouragement for the recovery of this alumina by a variation of the Pederson process. Technicians at Washington State College at Pullman report progress in recovery of alumina from clays in Clark County by a newly-developed process.

Alcoa went into the area near Hillsboro, Ore., in 1945 to investigate and explore the laterites of that region which contains about one-third iron ore and low-grade bauxite and about one-third each of iron oxide and aluminum oxide. The company has set up a laboratory at Hillsboro and its research facilities are investigating the most promising processes with an eye to recovery of the iron as well as the aluminum from these laterites.

An abortive effort was made to produce alumina from local clays at Salem, Ore., during the



AERIAL view of Alcoa's Vancouver smelting plant with a rated capacity of 85,000 tons of ingots yearly.

war. However, this venture proved both impractical and costly and was abandoned after a few months. This operation was under the direction of Columbia Metals Co., which began first to produce ammonium sulphate in a warm-up period and part of the plant is used today for the same purpose.

Another effort to recover alumina from low grade clays was made at the Kalunite plant at Salt Lake City but that, too, was abandoned as uneconomical and impractical.

However, these two failures have not deterred others in their efforts to develop a local source of alumina which would make Northwest plants much more nearly integrated.

If such alumina plants were developed, it is estimated that between 15,000 and 25,000 kw might be required for each and there have been reports to the effect that as many as three such plants are contemplated for the area which would mean still another heavy drain on the power pool which might reach 90,000 kw.

At the present time, Reynolds Metals Co. is getting its alumina from its Arkansas plant, where it is made from local bauxite for use at Troutdale, and at Longview when operating. Permanente Metals Corp. gets its alumina from its Baton Rouge, La. plant which reduces bauxite shipped in from South America. Alcoa secures its alumina from Illinois and Alabama. The freight per ton in trainload quantities of 1800 tons or more per shipment on alumina from these eastern sources to the Northwest plants is $8.93. Against this charge, which brings the total cost of freight for alumina to Northwestern plants up to approximately $5½ million per year, would have to be figured the $20 million to $25 million cost of an aluminum plant sufficiently large to supply these requirements. If three plants were built to supply each of the separate companies, the total cost would probably be considerably greater.

It is generally conceded that Alcoa would be the logical company to first build an alumina plant in the Northwest because its margin of overcapacity in alumina production is considerably less than that of the other two producers in the Northwest. Reynolds, even when running all of its reduction plants at full capacity, is said to have enough excess alumina capacity to produce more than 150,000 tons of metal. Permanente, if it used all of its capacity at Baton Rouge, would have enough alumina over and above its capacity at Mead and Tacoma to produce 125,000 tons of metal.

Postwar dreams for the production in the West of the still lighter metal — magnesium — apparently have evaporated under the heat of competition. The largest producer in the West during the war was Basic Magnesium, Inc., at Henderson and Gabbs, Nev., which was scheduled to produce 56,000 tons a year and which closed in June 1944. Production was short lived although approximately one fourth of all the incendiary metal used during the war was turned out there. Parts of the BMI plant are being operated now by Stauffer Chemical Co., Westro-Electric Chemical Co., and US Vanadium. The state of Nevada is negotiating with WAA for the purchase of the $146 million plant which has been costing WAA about $77,775 a month to maintain. The town of Henderson, Nev., is to be thrown in along with the plant. The state is holding out for a firm contract with the Southern California Edison Co. for uninterrupted power at an attractive rate and wants the WAA to set a fixed price on the properties. There is no indication that anyone wants to attempt to produce magnesium metal there.

Permanente Metals Corp., which was using the Hansgirg carbothermic process at Permanente, Calif., ceased production immediately after V-J Day and since that time has devoted considerable effort to pilot plant studies designed to reduce production costs. Last reports available indicate that considerable success has been achieved in producing magnesium of 90 pct purity but that it contained considerable carbon. It was recently announced that all production and research on magnesium had been stopped in favor of concentrating on aluminum. However, it is understood that this plant is being maintained in standby conditions.

The ferrosilicon plant at Manteca, Calif., also operated by Permanente Metals Corp., with a capacity of 10,000 tons of metal per year, has been shut down since the close of the war, as has that at Mead, Wash., operated by the Electro-Metallurgical Co., which had a capacity of 24,000

tons a year. These latter two plants were excessively high cost producers running up to 19¢ and 20¢ a lb.

At present there are no western producers of magnesium, although there have been several feeble bids for the plant at Mead. The Manteca plant is under the National Security Act and it is not believed there will be anyone willing to undertake production there. The Mead plant, which is likewise under this restricted order, may come into production if plants of a present would-be producer can be financed. This venture is doubtful because the production costs were excessively high here in comparison with cost of Dow Chemical Co.

Regardless of the economics involved in the production of aluminum in the Pacific Northwest, it is believed that the government will continue its paternalistic attitude toward the venture and encourage production for the establishment of satisfactory stockpiles of this light metal.

Looking ahead, market research men of Alcoa report that in 1939 approximately 39 pct of all aluminum used was consumed by the transportation industry and 8 pct by building construction. Just before the war in 1940, 40 pct of the aluminum went into transportation and 5 pct into building construction. In 1942, 63 pct was going into transportation and 3 pct for building.

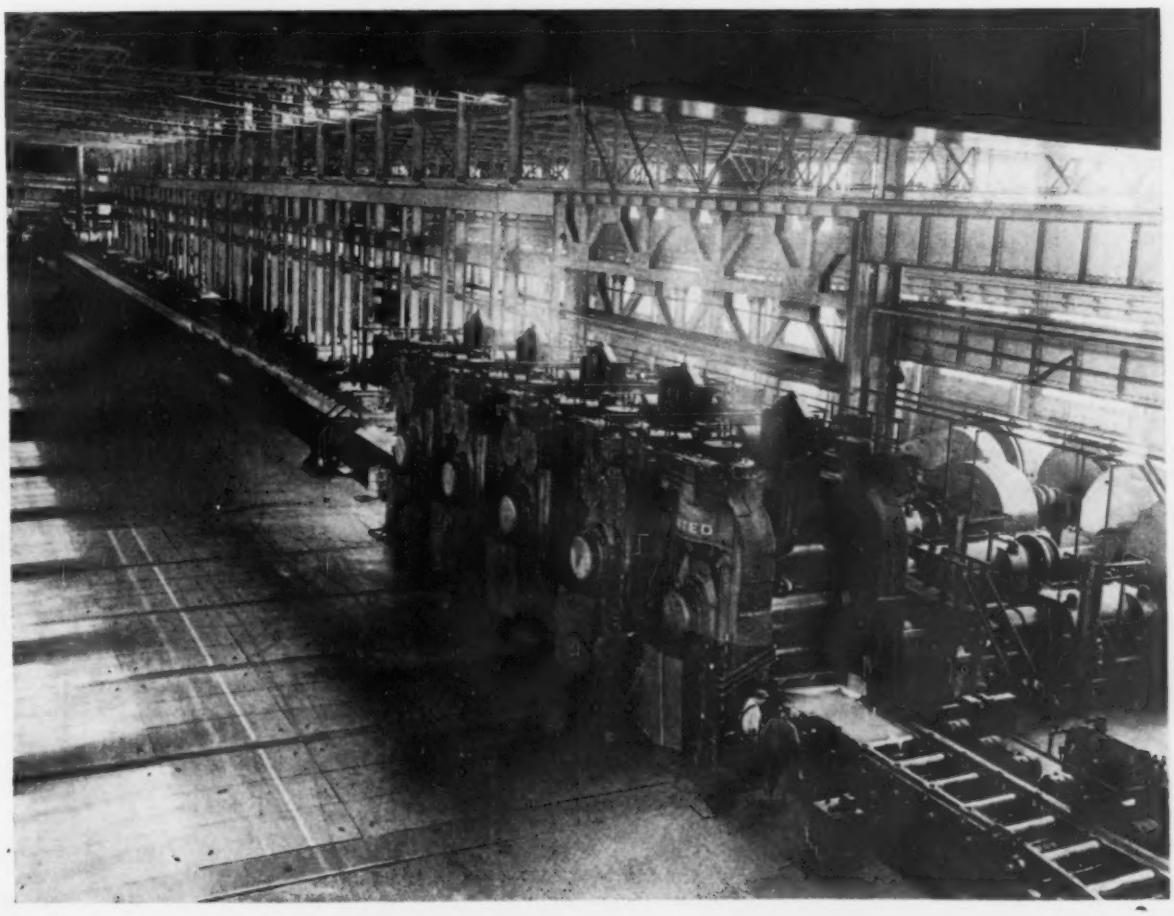
It is reported that the company had estimated that in the post war period about 34 pct of the aluminum would go into transportation and about 9 pct into building construction, but book orders in 1946 showed that the demand for transportation went to approximately 10 pct and building construction to approximately 26 pct.

Optimists in the industry believe that the greatest increase in consumption will probably be in the transportation field, and not only do they include airplanes and passenger and freight cars, but likewise automobile bodies and other parts.

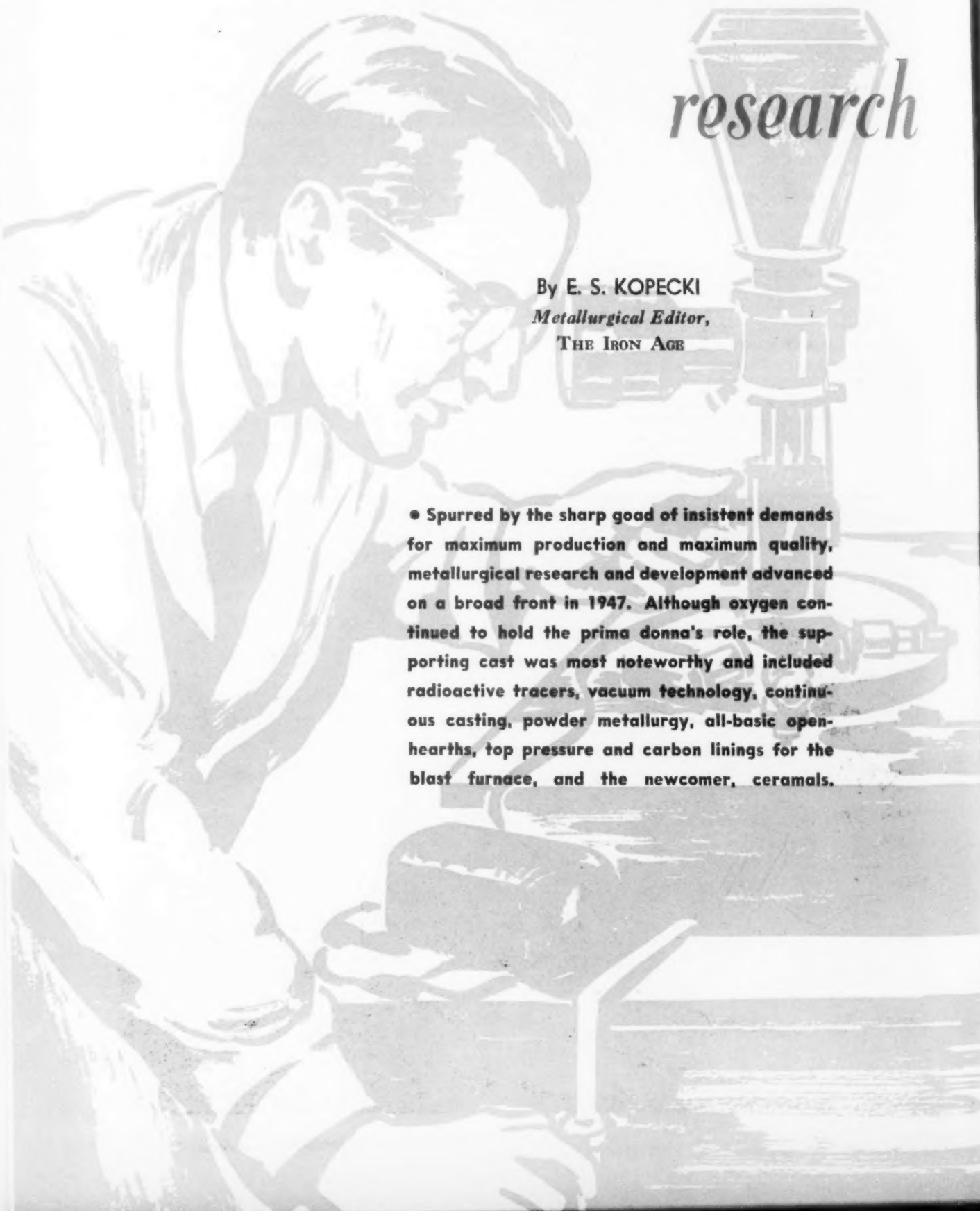
Historically, aluminum has had an unfortunate record in the automotive field, but there are those who believe that improvements in techniques and methods and the availability of material from more than one supplier will change this picture within the next year or two.

In general, the picture of aluminum is bright, but it is apparent that some adjustment and realignments are in order if western producers are to continue at their present high levels. It is further obvious that unless the Northwest power pool is to be sucked dry by this one industry, further expansions must be curtailed and additional power provided by the dams that are now on the drawing boards and recommended by the Bonneville Power Administration. Whether such a concerted and singular use of electric power is a sound thing economically for the Pacific Northwest is problematical, but the government wanted the plants located where they are; independent producers saw an opportunity to produce aluminum at competitive prices; and the Bonneville Power Administration found a ready outlet for what looked for a time as though it might be surplus power going to waste.

FIVE stand continuous mill at the Trentwood plant of Permanente Metals.



METALLURGY *research*



By E. S. KOPECKI
Metallurgical Editor,
THE IRON AGE

• Spurred by the sharp goad of insistent demands for maximum production and maximum quality, metallurgical research and development advanced on a broad front in 1947. Although oxygen continued to hold the prima donna's role, the supporting cast was most noteworthy and included radioactive tracers, vacuum technology, continuous casting, powder metallurgy, all-basic open-hearths, top pressure and carbon linings for the blast furnace, and the newcomer, ceramals.

drives to meet new economic needs

WITH the economic influence apparent in almost every technological development reported during the past year, it is evident that conditions are once again returning to truly civilian days with economics being the moving force behind metallurgical progress. Although some phases, such as vacuum metallurgy, radioactive tracers and high temperature materials may appear on the surface as purely scientific in improving quality rather than cost, it is inevitable that as soon as more data are obtained on these relatively new techniques to warrant evaluation, economic consideration will step in and take over in one form or another.

It is impossible to even attempt to review every bit of technological progress made in the many phases of metallurgy. Rather, it is the intent of this summary to survey the field and to touch upon some of the highlights that have aroused interest among quality and cost-conscious men.

A great deal of interest as been exhibited during the past year in the potentiality of the use of tracer isotopes in the study of fundamental metallurgical problems such as diffusion, oxidation, corrosion, metallography, process control, annealing and analytical procedures.

The simplest method of using a radioactive element is to incorporate it into the system under study and to measure the distribution of the "tagged" element in the system. This is done either by counting or by photographic plates. The photographic method, known as autoradiography, consists of placing specimens containing radioactive materials in contact with the film for a given time and then developing the film.

There are approximately 800 different kinds of nuclei, of which about 300 are stable and about 500 are radioactive. Since there are only 96 elements, it is evident that a given element can exist in a number of forms. Iron, for example, has seven different kinds of nuclei, four of which are the stable type. Of the remaining three types, $_{26}Fe^{52}$ has a half life of 10 min, $_{26}Fe^{55}$ a half life of 4 years, and $_{26}Fe^{59}$, the most important type, a half life of about 44 days. It is interesting to note that the shortest half life materials usually emit the highest radiation; they are cheaper and give more activity per dollar.

One of the more convenient and popular nuclear-radiation measuring instruments is the Geiger counter. Recent studies at the National Bureau of Standards have shown that diamonds are highly sensitive to gamma rays in the same way as a Geiger counter, and are, in fact, capable of indicating a much greater number of pulses per minute.

The Navy project in the Metals Research Laboratory at Carnegie Tech has carried several of the problems outlined in its program[1] nearly to completion. In the physical chemistry of steelmaking, studies on the rate of transfer of sulfur across the slag-iron interfaces have been carried out for a variety of reducing slags, both basic and acid. In addition, the influence of slag composition on the rate of iron absorption by the slag has been measured. Radioactive iron was employed in this determination. The distribution of calcium between slag and metal has also been observed with the aid of radioactive calcium.

The physical metallurgy division has determined the rate of self-diffusion in both alpha and gamma iron, see fig. 1.[2] It will be noted that, not only is the rate of self-diffusion about 100 times as great in alpha iron as in the gamma phase at the transition temperature, but that the activation energy is, somewhat surprisingly, also higher for alpha iron. The present value for the activation energy of alpha iron is 78,000 calories, and that for gamma iron is 48,000 calories.

Experiments on the mechanism of oxidation of iron by tracer techniques have revealed some new problems in this field. It now appears possible to correlate the kinetics and mechanisms of

[1] *See "Radioactive Tracers in Metallurgical Research,"* THE IRON AGE, *Sept.* 4, 1947, *p.* 60.

[2] *See "Self-Diffusion in Iron," Mining and Metallurgy, November* 1947, *p.* 555.

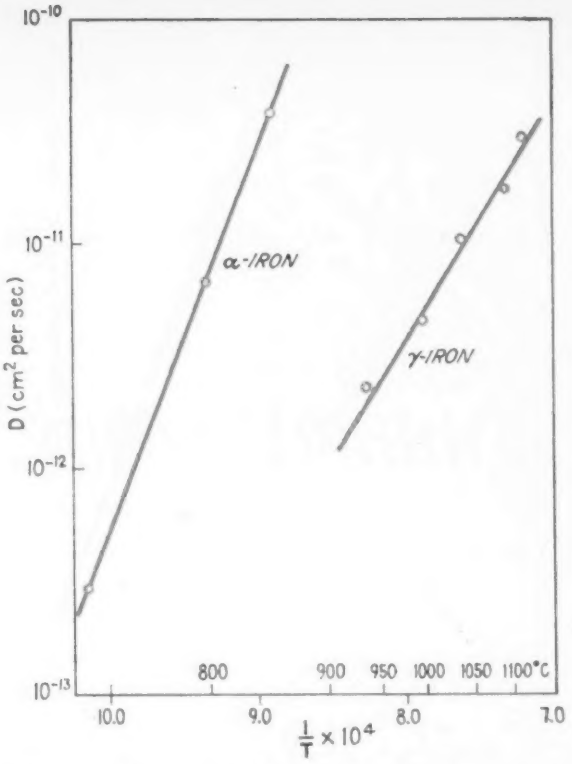


FIG. 1—Self-diffusion coefficients in alpha and gamma iron, determined by use of radioactive iron and Puron iron.

oxidation with the structures of the phases in the scale. Detailed publications of the sulfur transfer, iron self-diffusion, and iron oxidation studies are expected in the near future.

On the more practical side, safety measures for the handling of tracer materials in metallurgical research have been worked out carefully by this group. Special techniques have been developed to meet the problem in counting radioactive samples with the degree of precision required for these applications.

Some interesting experiments have also been conducted at the Westinghouse Research Laboratories on the diffusion of radioactive carbon, C^{14}, in gamma iron. To settle the argument as to the actual role of $BaCO_3$ energizer in carburization, radioactive $BaC'O_3$ (carbon is C^{14}) was used in the preparation of a carburizing mixture. The Geiger counter registered 162 counts per min on the original mixture, and 19 counts per min on the mixture remaining after carburizing; indicating that about 85 pct of the original radioactivity had disappeared and had evidently diffused into the gamma iron.

Work is continuing at Westinghouse, with the ultimate aim of determining the diffusion of carbon in alpha iron and perhaps some alloyed ferrites (silicon, aluminum, nickel and cobalt). Present technique is directed along the lines of trying to obtain resolution of metallic structures in which radioactive carbon is distributed in the ferrite and carbide phases. The autoradiographic method of laying a film on a photographic plate has been found satisfactory for macrographic studies, but not entirely satisfactory on a microscopic scale in view of the difficulty in resolving the fine structures. Some focussing devices for the beta radiation are now under consideration.

The art of continuous casting is continuing to show some of the most spectacular advances in the metal-producing field. In nonferrous metals the billet and slab machines are getting larger, faster and more accurate, and experimental equipment is being built to produce nonferrous and ferrous tubing. Marking a completely new step forward are three experimental machines being constructed for continuously casting metals; one for brass, copper and aluminum tubes, one for brass, copper and aluminum rods, and the third for steel tubes. A large aluminum machine is also being built capable of casting 10x48-in. slabs.

Although the nonferrous developments are indeed noteworthy, the real news in continuous casting is the growing interest in the continuous casting of steels, both carbon and alloy. The British Iron & Steel Research Assn. has announced a project to investigate the practicability of casting steel; however, there is every indication that success in steel will soon be achieved by an American company. Without doubt the next year will see the announcement of successful commercial casting of steel in a continuous manner.

Another process, while not strictly continuous casting, is the Hopkins (M. W. Kellogg) casting procedure, whereby steel or other alloys are melted in a mold under a slag blanket, with an individual consumable electrode. This process is showing a new spurt of activity, primarily for the high temperature alloys. A great many of the rotors for the new jet engine are being made by the Hopkins process. The casting conditions for this process are ideal for the production of a truly sound ingot. The steel is completely deoxidized, and solidifies progressively from the bottom to the top of the mold, at all times enclosed by a thin slag blanket.

This technique, with a few modifications, has been applied to increasing ingot yields in the making of carbon and stainless steels, high-speed tool steels and high temperature alloys. Employing a special flux and a nonconsumable electrode, elimination of ingot pipe has resulted in raising yields to about 90 to 93 pct. Details of this process will be divulged in the near future.

Oxygen Still Most Popular Subject

On another front, the use of oxygen in various phases of steelmaking continues to receive widespread attention from steelmakers and metallurgists as more and more plants turn to oxygen practice in either actual production or in experimentation. Most widespread utilization of oxygen has centered on the openhearth, although electric furnace practice has also received considerable attention.

Judging from the similarity of the comments expressed at the various technical society meetings whenever the subject "Oxygen" is brought up, it appears that there will be little more to offer in the way of increased knowledge until someone undertakes a truly scientific experimental approach to the matter. Although most steel companies and oxygen producers are cooperating wholeheartedly in disseminating what-

ever data they have accumulated, it still remains that variations existing from plant to plant in manufacturing techniques, character of charge, equipment, etc., will delay the setting up of any standardized practices for some time to come. Until then each individual plant will have to adapt the use of oxygen to its particular conditions, be they physical, economical or geographical.

Most steelmen are agreed that oxygen has proved itself when applied through a lance in the manufacture of low carbon steels, say under 0.06 pct C. Moderate amounts of oxygen are required, and oxygen as presently available can be used. Other advantages, from the standpoint of the openhearth, have been pointed out, such as controlling bath temperature and speed of the various reaction (such as initiation of the lime boil), when used in medicinal doses. In the higher carbon ranges, say 0.50 on up, use of oxygen is very questionable, since resulting bath activity is so great as to cause refractory troubles. This recalls to mind a statement made at a recent conference to the effect that one company obtained a substantial increase in production when calculated on the basis of unit time, but actually experienced such a greater downtime due to refractory difficulties that over the period of a year steel production by oxygen practice was less than under conventional practice. It would seem that a system of introducing oxygen in a mulitple operation is necessary for optimum results.

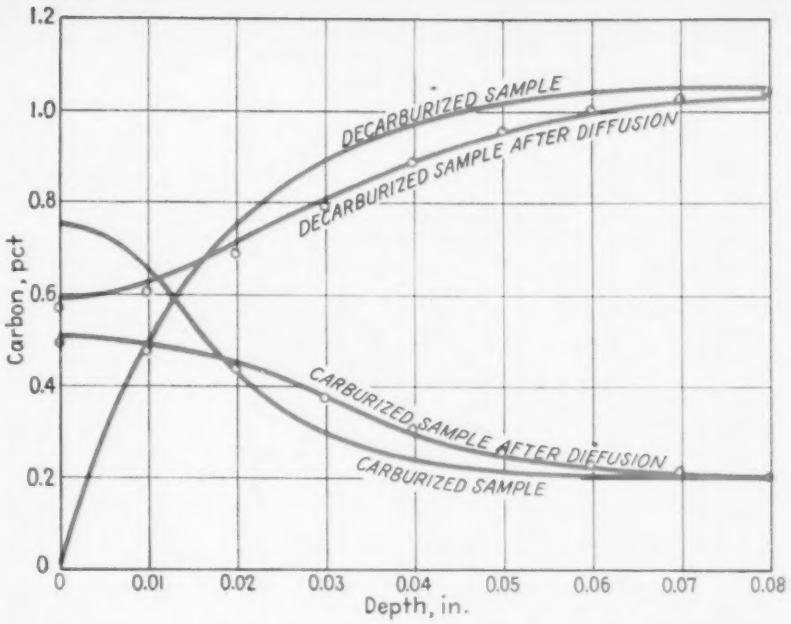


FIG. 2—Curves showing the carbon gradients before and after vacuum diffusion of a decarburized and carburized bar. Small circles represent calculated points.

The most comprehensive accumulation of data ever seen by the author, concerning the injection of oxygen into the openhearth bath, was presented at the fall meeting of the Assn. of Iron & Steel Engineers, by J. N. Hornak, of Carnegie-Illinois Steel Corp. This data, see THE IRON AGE, Dec. 25, 1947, p. 69, embraced the use of pure oxygen, 90 pct O_2, 70 pct O_2, 44 pct O_2, 20.8 pct O_2 (synthetic air-dry), compressed air (regular) and pure nitrogen.

Hornak pointed out that to assure that the data from heat to heat would be comparable, it was decided: (1) To make all the experimental heats in the same furnace; (2) to make all the heats to the same chemical specification; and (3) as nearly as possible to follow the same working and charging practice. Gas injection (by conventional oxygen lance technique) was started after the lime boil had partially subsided and after an ore, limestone, or ore and limestone addition had been made to the bath.

Bath temperatures were taken by means of an immersion pyrometer. The operator checked the pyrometer readings against furnace conditions and then either increased or decreased fuel input as required. For example, in a test heat blown with nitrogen, the rate of fuel input was increased to maintain a desired temperature, while in the case of blowing with 99.5 pct O_2, a considerable decrease in fuel input was made to avoid overheating the bath. This fuel reduction results in a saving that favors the use of high oxygen content gases.

Although there was, in some cases, considerable variation of the data from heat to heat, there was a fairly good correlation of the averages of the various groups. Analyses of the data for three of the gases used shows a considerable spread in the rate of carbon drop for the same melt carbon range; also that as the melt carbon or the carbon content of the bath at start of blow increases, the rate of carbon elimination also increases.

It was interesting to note the effect of merely agitating the bath with an inert gas such as nitrogen. Here the rate of carbon elimination was increased over and above that obtained with normal working procedure where lime and ore are used. These results indicate that, when oxygen-bearing gases are used, part of the oxidation of the carbon takes place by a more rapid intermingling of the steel of the bath and the iron oxide of the slag; also, by the exposure of the steel to the highly oxidizing atmosphere of the furnace. The maximum rate of carbon elimination will take place when the oxygen content of the agitating gas is between 90 and 100 pct.

There has been a gradual falling off of experimental work of so-called "combustion oxygen" as compared with carbon reduction, due to the relatively large amounts of oxygen required. Although some plants have reported refractory troubles, in general these difficulties apparently do not bother most plants. A jet device for initiating scrap meltdown has been proposed, and although it is still in the experimental stage of development, it does look interesting.

The three important uses of oxygen in electric furnace practice: (1) As an aid to scrap melting, (2) as a means of controlling bath tempera-

ture, and (3) to accelerate decarburization, were very recently discussed by J. H. Berryman of Air Reduction Sales Co. He pointed to future possibilities of more fully utilizing the advantages offered by the use of oxygen: (1) A stack type roof has been thought of which would carry off the gases generated and permit greater volume of oxygen to be used with resultant reduced heat times; (2) an oxygen-oil burner to be used in conjunction with the stack type roof would be a fast way to melt the scrap after a molten pool is obtained using the electrodes; and (3) a combination of ore and oxygen for carbon removal to control bath temperature is being tested. A hopper containing crushed ore is used through which oxygen is passed and this combination of oxidizing agents is introduced below the slag-metal interface.

The Bethlehem Steel Co., Johnstown operation, where an oxygen plant is under construction for the purpose of furnishing a blast furnace with 150 tons of oxygen per 24-hr day, is expected to be in operation in another month or two. Oxygen of 90 pct purity will be produced and this will be mixed with air to cut the workable gas fed into the blast furnace down to about 25 to 30 pct. It is of interest to note that some blast furnace operators question the merit of using oxygen for this operation, and make the observation that what with top pressure and beneficiation, there is little left to be gained from oxygen-enrichment in increasing production output or in reducing coke requirements.

Cupola work has been initiated at several points, and some tests run on a 20-ton per hr cupola with oxygen at 24 pct, indicate an increase of 20 pct in output, with an 8 pct coke saving. Economics of this operation are very doubtful, however, due to the intermittent nature of cupola practice. Tests on bessemer operations are anticipated, with interest being centered on nitrogen content.

Producing Gas-Free Metal with Vacuum

A great deal of experimentation is currently underway for the purpose of producing gas-free metal with the use of vacuum. Many theories have been advanced in recent years, holding that absorbed or entrapped gases are responsible for a great variety of physical defects in steel and other metals, and work has been undertaken at many sources to discover if, by applying vacuum during melting and/or during heat treatment, any major improvements in physical properties could be achieved. No particularly startling developments have been divulged lately, although work done does indicate promise for the utilization of vacuum in many phases of metallurgy.

At the Massachusetts Institute of Technology, for example, studies are being made of the solubility of hydrogen in aluminum and aluminum alloys, and also of the hydrogen solubility in steel. For the steel work, there has been developed a vacuum system which makes use of mercury cutoffs to eliminate the use of stopcock grease in the presence of a hydrogen atmosphere. Work is also being conducted on the behavior of pure metals under stress at high temperatures in vacuum—the vacuum being used in order to eliminate atmosphere as a variable.

General Electric Co. recently reported the melting of several hundred alloys in a vacuum melting system in which a centrifugal casting operation is performed, with an arrangement provided for loading and making additions to the furnace without disturbing the vacuum. The pumping arrangement was such that two 100-cfm mechanical pumps, one 20-cfm mechanical pump, and either a 500-liter per sec oil diffusion pump or a 200-liter per sec booster pump were employed. The pumps were connected so that one 100-cfm mechanical pump could be used to back up the oil pump. The vacuum machine was capable of melting and centrifugally casting 6 lb of metal, at pressures less than 50 microns, in 1-hr cycles.

National Research Corp., which is probably the most active unit in this country in so far as making available gas-free metals and vacuum furnaces is concerned, reports that techniques have been developed to produce gas-free copper, iron, nickel, cobalt, manganese, chromium, and aluminum.

At the recently held 39th annual meeting of the Institute of Metals, in Glasgow, Ivor Jenkins described his attempts to ascertain the factors causing stains on coils of 70:30 brass strip during heat treatment. Tests showed that the surface staining, which took place during annealing in cracked ammonia, and which was associated with oxide formation, was due to oxygen-containing gases. These might be released from the brass itself, or residual air might be responsible. When small samples of the brass were heated in vacuum at 1110° F for ½ hr, a fairly large amount of gas was liberated and this contained 54 pct CO_2, 29 pct CO and 17 pct H_2. These gaseous oxides of carbon were believed by Jenkins to have been derived from the oils used in rolling, and he found that if the metal surface layer was ground off, much less gas was released on vacuum heating, the bulk of which was hydrogen.

Further experiments showed that coils of degreased strip could be successfully bright-annealed by first heating in vacuum to 930° F to remove adsorbed gases, followed by treatment under static cracked ammonia at 1065° F long enough to allow sufficient zinc to diffuse to the surface. Coils of brass strip could be bright annealed without degreasing if the turns of the coil were spaced so as to insure the complete removal of oxidizing and sulfurous gases. Zinc loss during annealing could be considerably reduced by adding methanol to the furnace atmosphere.

The potentialities of vacuum heat treatment of metals have recently been explored under the sponsorship of the Committee on Industrial and Commercial Gas Research, American Gas Assn., in the Surface Combustion Co. laboratories. Results of the experiments, while positive in nature, do not lead to any new commercial processes at the present time.

In general, it has been found that small quantities of adsorbed gases do have deleterious effects upon the properties of the metal, but such

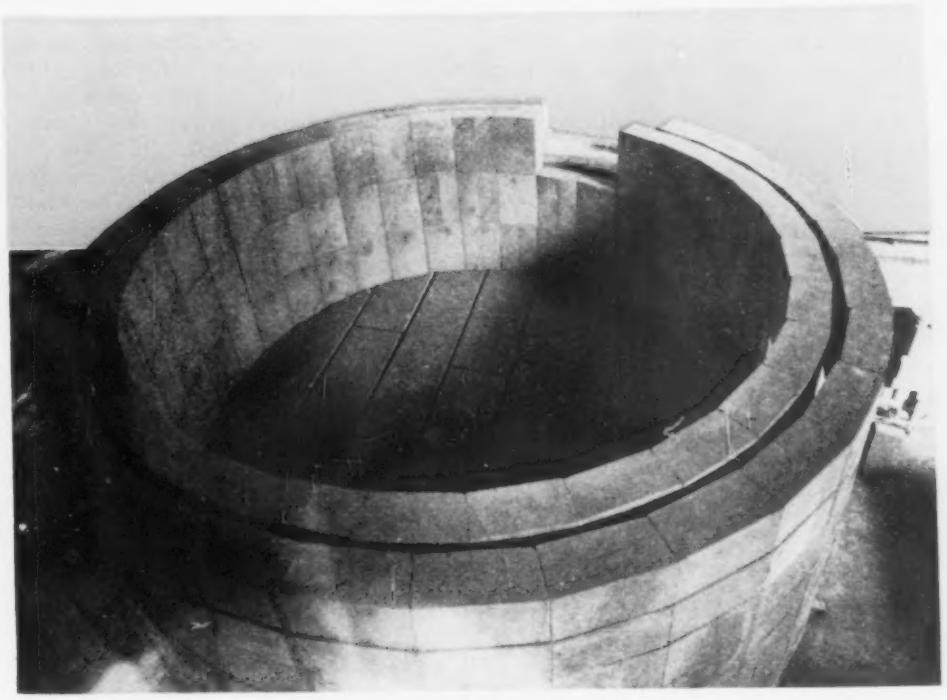


FIG. 3—The 21 ft 6 in. ID carbon block blast furnace lining shown above has two wall courses 15 in. and 11¾ in. thick. When installed, the back wall has an additional 4 in. of coke braize between it and the shell for insulation. Wall blocks weigh about 600 lb apiece. The horizontal hearth blocks are in two courses each 22½ in. thick, with the longer pieces 180 in. long and weighing about 6800 lb. Photo courtesy National Carbon Co.

effects are rather small. Comparatively coarse measurements such as hardness and tensile strength are for the most part unaffected, whereas processes such as malleableizing or measurements such as fatigue life, which are effected by small changes, do exhibit recognizable differences. For these reasons, adsorbed gases can probably best be thought of as inadvertent, minor alloying additions. When these additions are allowed to become large, for example, through pickling or faulty melting practice, pronounced effects can result. When the gases are present in amounts corresponding to their solubility values, which are small, their effects are correspondingly small.

It was found that vacuum malleableizing is superior in consistency, physical properties, and speed to any of the common prepared atmospheres. The improvement over low hydrogen atmospheres is not very pronounced, however. These tests have definitely shown that hydrogen interferes with the malleableizing process, making the use of high hydrogen atmospheres inadvisable for the process. Vacuum malleableizing, in addition to being somewhat faster and more consistent, gives complete freedom from ferritic and pearlitic rims which are so far unavoidable in any type of atmosphere. Thus a finished part could be malleableized and used directly without the necessity of machining after treatment to remove the rims.

It was found that in one case evacuation prior to quenching prevented the samples from cracking, whereas the same steel did crack when quenched from RX gas. Definite improvement in fatigue life of beryllium-copper valve springs was developed by carrying out the age hardening treatment in vacuum rather than in air. The tests also demonstrated that steel is as easily carburized by a hydrocarbon gas in the absence of oxygen compounds as it is when such compounds are present. In fact, the carburizing potential was slightly higher than would be expected. It was also shown that the carbon diffusion rate was identical in vacuum, in nitrogen, and in the conventional hydrogen-containing carburizing atmospheres. In demonstrating this fact, a variable equation was devised to predict the carbon gradient after any diffusion treatment. In fig. 2, the carbon gradients before and after vacuum diffusion are shown for a decarburized and carburized bar. In this figure the circle represents the calculated points. The good agreement between calculation and test may be noted.

Spheroidizing tests have shown that the spheroidizing rate is not influenced by vacuum. The deep drawing properties of rimmed and killed steels were not improved by vacuum annealing. Quenching steel from vacuum failed to improve either impact strength or fatigue life.

Carbon Linings Improve Blast Furnace Operations

The oldest carbon block linings now in American blast furnaces have been in use for close to 3 years, and from all indications their performance has met all the requirements thus far, and they hold promise of being as successful as the European installations which have remained in furnaces for as long as 16 years. Not a single failure of a carbon block lining has been recorded in this country to date.

Some 35 carbon linings of all types are reported to have been installed, 31 by the National Carbon Co. and 4 by Great Lakes Carbon Corp. This number plus the some 17 linings still on order, means that in approximately 7 months, there will be about 52 linings in use.

It may be of interest to mention various types

of carbon installations:

(1) Double block bottom—double block wall.

(2) Double block bottom—single wall (large block type and small block type).

(3) Single block bottom—single block wall.

(4) Single block bottom lining.

(5) Wall patch linings (large block double course and small block double course types).

(6) Rammed bottom—ceramic sidewalls.

(7) Single block bottom—inner sidewall carbon, outer wall ceramic brick.

(8) Double block bottom—ceramic sidewalls.

Recent published information indicates that the block linings have remained untouched by erosion or chemical reaction, and still cast as cleanly as when first installed. This is especially noticeable of the furnaces that were designed with high bottoms, so that new grades of merchant iron could be melted and tapped without contamination by a salamander of the old burden. Comments received from the users of carbon block crucibles indicate that their tap hole practice has been greatly improved. The uniformity of both the time of cast and volume of hot metal is said to be definitely superior and coke messes are practically eliminated with carbon hearth bottoms.

While most early American carbon linings were installed only as a crucible, there is an increasing tendency on the part of the operator to raise the carbon side wall height from the top of the hearth jacket or centerline of the cinder notch to a point closer to the tuyeres. Eventually, American linings may be extended up to the mantle.

It has also been determined that when a pool of metal is to be provided, the level of the horizontal hearth sections should be established at a point somewhat below those normally calculated, because carbon has the ability to withstand the action of the hot metal without eroding and cannot be expected to provide a salamander from such cause.

One operator who has had carbon linings on heat since December 1945, reported that those furnaces yielded acceptable iron for the open-hearth in one-third to one-half the time of ceramic-lined hearths when his furnaces were coming in off bank following a shut-down, and that the carbon hearths caused less skulling on the hearth walls and less trouble in getting a proper flush from the cinder notch.

Those furnaces that have carbon iron notches also show unusual resistance to erosion in the notch, and many operators have reported that the length of the tapping hole is easy to maintain and that short holes are an exception.

Decreases in ore quality and coal and coke quality, said to have already caused a 10 pct drop in blast furnace productivity, brought the blast furnace under discussion from the standpoint of top pressure, beneficiation and oxygen. The classic paper presented at the May, 1947, American Iron & Steel Institute meeting by J. H. Slater of Republic Steel Corp. discussed in great detail the performance of two furnaces under continuous pressure operation since August 1946. Through increase in average static pressure by increasing blowing pressure and throttling exhaust gases, it was possible to decrease the velocity of gas through the furnace while blowing the furnace at substantially higher wind rates. Iron production was increased 11 to 20 pct, coke rates were decreased about 13 pct, and flue dust production was cut by approximately 30 pct. These results were said to have reflected in a manufacturing cost saving of more than $1.00 per ton iron.

Subsequent published data reviewed some of the data presented by Slater, and estimated the results which would be obtained by operating a blast furnace at still higher pressures, combining oxygen-enriched blast with high top pressure, and using beneficiated ore with oxygen-enriched blast and high top pressure. The estimates indicate that by a combination of all three measures it should be possible to double the output of a furnace.

"Ceramals" Invade High Temperature Field

Interest in materials for high temperature service continues undiminished from that exhibited during the preceding 2 years; however, where metals were previously the center of attraction, and ceramics to a slightly lesser degree, interest is growing in the use of combinations of ceramics and metals under the name of *ceramals*. There are a variety of techniques being investigated, and the work is still of such a fundamental nature that relative merits of the different techniques are certainly not distinguishable.

One technique is to add oxides and intermetallic compounds to metals, while another is to bond nonmetals such as borides, carbides, and oxides, with pure metals and single-phase alloys. The work being performed is not limited to the practice whereby the metal phase is necessarily molten at some phase of the process, but also embraces the powder metallurgy technique of compacting and sintering the components. An interesting approach is taken by the Sintercast Corp. of America, whereby a porous ceramic compact is prepared under pressure, conditioned by treating with a wetting agent, and a molten metal then infiltered into the compact. A promising feature of this latter technique is that both the ceramic and metal phases will be essentially continuous.

As part of an extensive Office of Naval Research program to prepare liners and turbine parts for jet engines, Alfred University has undertaken a fundamental study of the reactions occurring between certain metals and ceramic oxides and carbides at high temperatures in oxidizing atmospheres. Combinations of silicon, cobalt, chromium, nickel, iron, tungsten and molybdenum with alumina, silica, magnesia, zirconia, beryllia, chromic oxide, cobalt oxide and silicon carbide are under investigation. Equimolecular mixtures of metal and ceramic oxide are compacted and heated for a series of time intervals at temperatures up to 2550°F under precision temperature control in oxidizing atmospheres. Weight changes during firing and a thorough study of the phase changes by means of X-ray diffraction and petrographic analysis are recorded with a view to tracing the path and velocity of the reactions involved. Metal compacts are also fired in contact with ceramic pellets in order to evaluate the extent of inter-

FIG. 4—A stainless steel ingot in the process of being powder scarfed and the same ingot after scarfing has been completed. Photo Courtesy Linde Air Products Co.

diffusion under the conditions of the experiments. Spectrographic analyses are employed to measure the diffusion gradient after firing of these contact specimens and radioactive tracers will be used to gain added precision.

The results from this study are expected to be useful in developing the field of metal-ceramic mixtures, some of which have already shown promise in view of their high thermal endurance and strength at high temperatures.

In addition to the Navy project, two studies have been made in the New York State College of Ceramics to investigate the properties obtained by combining ceramics and metals. Silicon carbide, aluminum oxide, fire clay grog and whiteware grog, all in a finely divided condition, were combined with powdered metals of copper, nickel, iron, silicon and aluminum. The metals were added in varying amounts up to 20 pct. The specimens were fired at several temperatures up to 2730°F. Some decidedly interesting results have been obtained and are being investigated further.

Eliminating the pure oxide refractories considered unsuitable due to stability limitations and economic considerations, interest in the pure oxides boils down to three materials; magnesia (melting point 5070°F), alumina (3720°F) and zircon (4410°F). Each of these is available in a high degree of purity. Many factors are said to be still unknown about the commonest types of refractories and a great deal of fundamental research must yet be conducted before practical high temperature applications can even be visualized. Melting point data, thermal expansion, volatility, reduceability, reaction with gases, strength and allotropy are held to be factors that may govern service performance of refractories. Although no mention has been made herein with respect to the high temperature metallic materials, it is not to be inferred that no developments have been forthcoming. Actually, so much effort has been expended in this direction that it is difficult, if not impossible, to attempt to evaluate the large mass of data published. The author cannot recall seeing in print any conclusive data nor evaluation of even a fraction of the many hundred alloy compositions. Sev-

eral projects are underway whereby the data is being surveyed, and one of these days some expert or experts close to the subject will find the time to prepare a correlated study of exactly what has been learned.

All-Basic Openhearth Furnace Shows Promise

Experiences gained to date on the all-basic openhearth furnace at the South Chicago works of Carnegie-Illinois have not been conclusive. The chief reason has been due to present operating difficulties. The company has not been able to run the furnace at a sufficiently high rate to determine the limits to which such a furnace can be used due mainly to the poor quality of scrap, which has not permitted the fast charging rate which the plant uses in normal times. The basic furnace has a much shorter heat time but because of charging difficulties it has not been possible to always take advantage of this.

About 350 heats have been melted in this furnace and, although extensive patching to both ports, front and side walls has been done, the roof has been untouched. It is believed by Carnegie-Illinois that if the all-basic roof is not too heavily contaminated with FeO it is possible to run the roof at temperatures close to 3500°F; thus far they have limited the roof temperature to 3200°F. To speed up the rate of melting the plant has been atomizing the fuel with compressed air, which is preheated through the checkers. The old practice of using steam, where it took ½ lb of steam per gal of oil used, resulted in too great a loss of heat value from the furnace. As yet C-I is not sure what the exact saving in Btu's has been when atomizing the fuel with compressed air.

Meltdown Rate Faster

Oxygen has been extensively used, not in the lance or jet, but rather through specially designed burners directly under the fuel nozzle for fast meltdown time and to get and maintain sufficient temperatures. On the average, melting time from charge to meltdown has been 50 pct faster than usual on a tons per hour basis. Flame intensities have been measured with a Brown photoelectric cell with the usual electronic recorder so that relatively close control of temperature has been possible. It appears as though another six months or year's operation will be necessary on such furnaces before steel producers can collect enough data to know accurately if the higher costs of construction are worthwhile from an economic and practical standpoint.

The only other all-basic openhearth furnace in current operation on this continent is the 180-ton installation at the Steel Co. of Canada, Hamilton, Ontario, which has been in use since February 1945. The fourth roof is now in the furnace, with about 1400 heats having been made. Reports from this source are quite encouraging in that the savings incurred are said to be more than sufficient to cover the additional original cost of the refractories.

Improvements in powder metallurgy techniques have made possible the manufacture of high purity molybdenum ingots up to 250 lb and solid cylinders, tubes, disks, squares and other shapes with diameters up to 7 in. and lengths up to 30 in. This molybdenum manufacturing technique, recently revealed by the Westinghouse Electric Corp., utilizes high purity metal powder produced by the reduction of very pure molybdenum oxide or ammonium molybdate in hydrogen.

The high melting point of molybdenum, 4750°F, requires that powder metallurgy processing be employed. Essentially, the molybdenum powder is compacted at a pressure of about 40,000 psi, and then sintered in a hydrogen atmosphere at a very high temperature by passing electric current through the pressed bars. The sintered bars are then worked at high temperatures by rolling, forging or swaging and finally working to the required size and shape at lower temperatures.

Surpassing steel from the standpoint of melting point, modulus of elasticity, strength at elevated temperatures, and thermal conductivity, molybdenum is lower than steel insofar as specific heat and coefficient of expansion are concerned. Its corrosion resistance compares favorably, in many media, with tantalum, palladium and platinum.

A relatively simple method for making metallic powders from volatile compounds of refractory metals was reported as having been applied to tantalum and columbium. In applications not requiring a complete separation of columbium and tantalum, it was found possible to carry out the manufacture of metal powder directly from the ore concentrates in a very few operations. If pure tantalum or pure columbium is required, then the usual procedure for the chemical separation of the metal oxides is used, and is followed by mixing of concentrate and carbon, chloridizing, mixing chlorides and magnesium, reduction, leaching, and drying. Tantalum or columbium scrap may be directly chloridized without carbon. The relative freedom of this procedure from difficulties of all types is in marked contrast to the electrolysis of fused salts used commercially at present.

A further superiority of the process over the electrolytic method is said to lie in the grade of powder produced. The fused-salt electrolysis generally gives a product coarser than 50 microns while the new process satisfies a need for finer powder, by making possible the manufacture of powder finer than 10 microns.

Another interesting development is said to be an electrolytic technique for producing cobalt powder of 99.99+ purity. It is anticipated that this material will find use in magnetic materials and low coefficient of expansion alloys.

Powder Scarfing Stainless Steel

Strides made in developing techniques for flame scarfing stainless steels have been reported by both the Air Reduction Co. and Linde Air Products Co. Cutting and scarfing offer problems similar in scope, except that the greater speeds used in performing the scarfing operation raises difficulties of providing sufficient heat in-

put to the steel surface. Stainless steel does not yield to the oxyacetylene torch with conventional methods, because its alloying elements form a layer of impervious refractory oxides. As a result, laborious and costly grinding methods have been necessary to condition the stainless steel ingot or slab for satisfactory rolling.

Now, by adding a suitable supplementary agent flame scarfing of stainless steels has been successfully accomplished. The supplementary agent is finely-powdered iron, which burns in the zone of the scarf with intense heat and acts in the manner of a flux to liquefy the refractory oxides and make possible a scarfing operation comparable to that obtained on mild steel. The costs, in time and equipment, when compared with previous methods such as grinding, are said to offer valuable savings in the production of the stainless steel alloys. By powder scarfing, the complete surface of a bloomed ingot weighing about 25,000 lb is said to be conditioned by one man in 8 hr, which is considerably less than with former methods. Fig. 4 shows a stainless steel ingot in the process of being powder scarfed and the same ingot after scarfing has been completed.

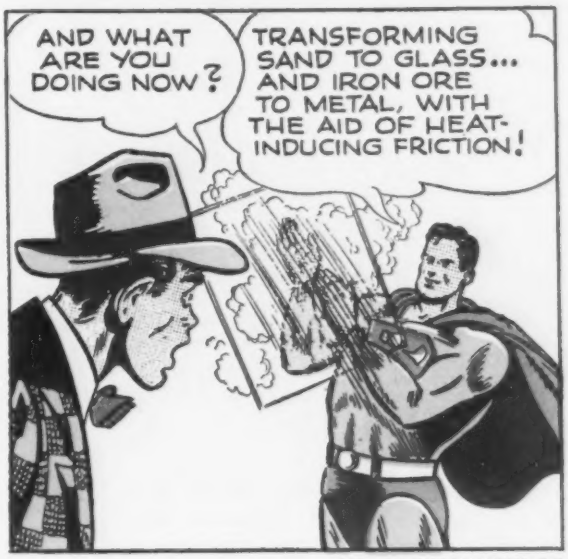
Inert gas-shielded arc welding has undergone considerable development and improvement, with emphasis on expanding the usefulness and scope of the process. This method, which employs a sheath of inert gas (preferably argon) to protect the virtually nonconsumable tungsten electrode and weld puddle, has been extended to the welding of stainless, high carbon and other alloy steels, aluminum, brass, Inconel, Monel, Everdur and pure silver. An outstanding feature is that all of these metals can be fusion welded without the use of a flux. Also, the method can be used to braze pure silver and silver alloy coatings on steel, stainless steel, and aluminum and for the deposition of hard-surfacing materials.

New Refractory Developed

A new castable refractory, said to easily withstand temperatures as high as 3000°F and which shows excellent stability and resistance to spalling under repeated heating and cooling cycles, has been developed by the Babcock & Wilcox Co. Because it can be either poured into place like ordinary concrete used in construction work or used as a ramming mixture, the cement, called Kaocast, will effect considerable savings in furnace construction. Because its volume change is negligible under high temperature, Kaocast is said to be ideal for deep patching of spalled or eroded brickwork.

A new "extrusion molding" process, not as yet described in the literature, makes possible the processing of all types of alloys with comparative ease. Parts such as machine gun barrels, bomb rack mechanisms, gas turbine blades, turbine rotors, to name a few, have been produced from many types of alloys, including most all standard nonferrous alloys, such as Alcoa 355 and 75ST, and others such as magnesium-beryllium, aluminum-beryllium, copper-beryllium-nickel, and beryllium-copper.

Whither Metallurgy??



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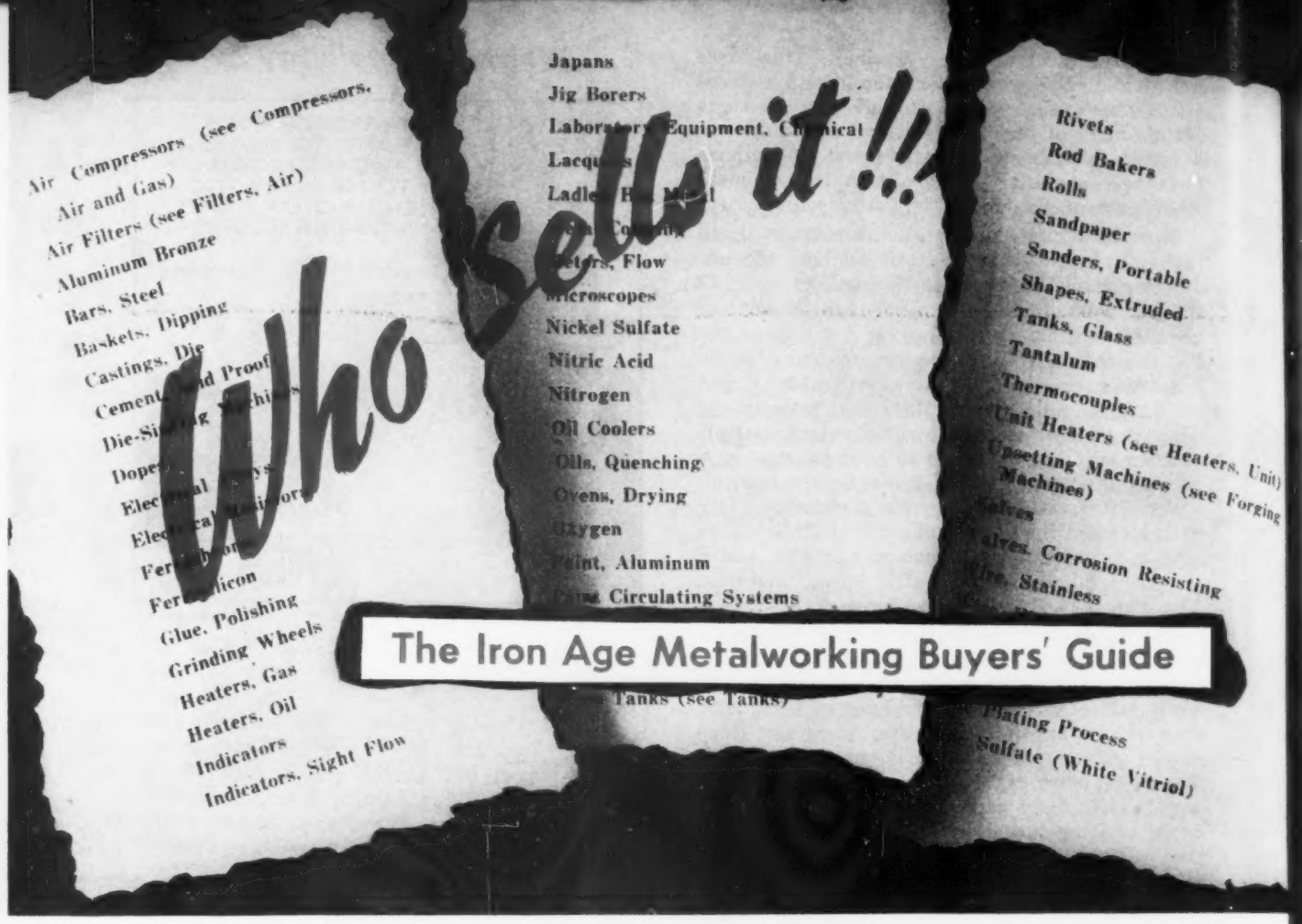
A feature of the process is that operations are performed on the alloy while it is still in the mushy stage; i.e., in the region between the liquidus and solidus. Quite often, more than 1.5 million lb of force is employed. Molded extrusions are said to possess unique metallurgical characteristics peculiar to the process, and have the added advantage of reproducibility of results.

Announcement was made during the past year of a new alloy that carries more magnetism than any other alloy practical for use in motors and generators and is tough enough to withstand intense vibration. This alloy, called Hiperco, contains 35 pct Co, 64 pct Fe and 1 pct Cr, and makes possible compact electric motors and generators about 10 pct smaller and lighter than those of equal power now built for aircraft. This is possible because the high magnetic saturation point permits the design of motors with less metal for the same power or more power from the same amount of metal. A heat treating technique has been worked out that makes the metal strong and workable.

A method for doubling the strength of gray cast iron was reported by the British Cast Iron Research Assn. A simple treatment of gray cast iron results in the production of an iron with a graphite structure of nodular or spherical form instead the stringy elongated flake structure usually found in gray cast iron. The tensile and transverse strength and impact resistance are double that of conventional gray cast iron with only a negligible increase in hardness and little or no difference in machinability. The report stated that the new iron is not necessarily meant to supplant present high duty irons, but rather that it will be used as a base for producing high duty cast iron, the properties of which will no longer be determined by the flake graphite structure. A highlight of the treated material was reported to be its uniformity in properties from piece to piece.



By A. D. STOUT, JR. and T. S. BLAIR

Associate Editors,

THE IRON AGE

THIS is a buyers' directory of, by and for the metalworking industry. It starts in this issue and will appear in successive weekly installments until completed. Shortly thereafter it will be available in reprint form.

There has never been a dearth of buyers' guides for industry. Some of them cover capital goods and equipment as well as consumers' goods; others deal with only a vertical fractionation of a particular industry; most of them are tied in with advertisers and list only a keyed partial group of sources for any particular equipment, material or process.

The editorial staff of THE IRON AGE is constantly required to answer letters of inquiry as to the source of some particular material or equipment or process. Existing directories are all too frequently of little use in satisfying these inquiries inasmuch as the headings are not specific enough or the companies listed represent only a fraction of the possible sources. For this reason THE IRON AGE over the years has built up a file of names which is believed to be completely functional. Product and equipment headings are broken down into as fine classifications as deemed practicable.

Prior to publishing this buyers' directory all of the many thousands of companies in the metalworking industry were twice asked by letter to list their products, equipment and processes. Despite this attempt for complete accuracy, it is probably true that this directory unavoidably suffers somewhat from the same occupational hazard as other directories, namely gaps in headings and certain omissions in sources of supply. Therefore, every company is urged to check this directory, as printed in this and subsequent issues, and advise THE IRON AGE as to corrections and additions that are to be included in the first reprint for general distribution.

Abrasive Blasting Equipment

American Foundry Eqpt. Co., Inc., 412 S. Byrkit St., Mishawaka, Ind.

American Wheelabrator & Equipment Corp., 412 Byrkit Ave., Mishawaka, Ind.

Dreisbach Engineering Corp., 85 Warburton Ave., Yonkers 2, N. Y.

Galbreath Machinery Co., (Used), Empire Bldg., Pittsburgh.

Harrison Abrasive Corp., Merchants Bank Bldg., Manchester, N. H.

Hydro-Blast Corp., 2550 N. Western Ave., cor. Logan Blvd., Chicago 47.

Metallizing Co. of America, Inc., 1330 W. Congress St., Chicago 7.

Metallizing Engineering Co., 38-14 30th St., Long Island City 1, N. Y.

Pangborn Corp., Pangborn Blvd., Hagerstown, Md.

Parsons Engineering Corp., 2549 E. 79th St., Cleveland 4.

Ruemelin Mfg. Co., 3860 Palmer St., Milwaukee 12.

Abrasive Cloth, Paper

Beals, McCarthy & Rogers, Inc., 50 Terrace, Buffalo 5.

Behr-Manning Corp., 1900 Sidford St., Troy, N. Y.

Carborundum Co., Niagara Falls, N. Y.

The Cleveland Tool & Supply Co., 1427 W. 6th St., Cleveland 13.

Charles Fischer Spring Co., 751 Atlantic Ave., Brooklyn 17.

The Manderscheid Co., 810 Fulton St., Chicago 7.

The Mid-West Abrasive Co., 500 S. Washington St., Owosso, Mich.

Pittsburgh Steel Foundry Corp., Glassport, Pa.

Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37.

Abrasive Cutting Machines

Botwinik Bros. of Mass, Inc., 5 Sherman St., Worcester 1, Mass.

Interstate Machinery Co., 1435 W. Pershing Rd., Chicago 9.

The R. K. LeBlond Machine Tool Co., Madison & Edwards Rds., Cincinnati 8.

Porter-Cable Machine Co., 1708 N. Salina St., Syracuse 8.

Simons Machine Tool Corp., Albany 1.

West Penn Machinery Co., 1210 House Bldg., Pittsburgh 22.

Abrasive Belts

Allied Industrial Products Co., 620 North Michigan Ave., Chicago 11.

Carborundum Co., Niagara Falls, N. Y.

The Cleveland Tool & Supply Co., 1427 W. 6th St., Cleveland 13.

The DoAll Co., 254 N. Laurel, Des Plaines, Ill.

Formax Mfg. Co., 3000 Bellevue St., Detroit 7.

M. P. Iding Disc Grinding Compound Co., 3530 W. Pierce St., Milwaukee 4.

The Mid-West Abrasive Co., 500 S. Washington St., Owosso, Mich.

Norton Co., Bond St., Worcester 6, Mass.

Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford 1, Conn.

The Puritan Manufacturing Co., Waterbury, Conn.

Sommers Bros. Manufacturing Co., 3439-41-43 No. Broadway, St. Louis 7.

Abrasive Powders (Silicon Carbide, etc.)

Allied Industrial Products Co., 620 N. Michigan Ave., Chicago 11.

Carborundum Co., Niagara Falls, N. Y.

The Cleveland Tool & Supply Co., 1427 W. 6th St., Cleveland 13.

Detroit-Star Grinding Wheel Co., 111-177 Cavalry Ave., N., Detroit 9.

General Abrasive Co. Inc., Niagara Falls, N. Y.

Hanson-Van Winkle Munning Co., Matawan, N. J.

Linde Air Products Co., 30 E. 42nd St., New York 17.

The Mid-West Abrasive Co., 500 S. Washington St., Owosso, Mich.

Norton Co., Bond St., Worcester 6, Mass.

Ottawa Silica Co., Ottawa, Ill.

Send in Corrections For The Buyers' Directory

Certain inaccuracies and omissions are unavoidable in the first issue of a buyers' directory covering as many subjects as does this one. Every company in the metalworking industry is urged to check this and subsequent issues, and promptly send in all necessary corrections and additions to assure complete accuracy in the first reprint of the directory. Corrections should be sent to THE IRON AGE, attention Buyers' Directory, 100 E 42nd St., New York 17.

James H. Rhodes & Co., 157 W. Hubbard St., Chicago 10.

Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37.

Wedron Silica Co., 38 So. Dearborn St., Chicago 3.

U. S. Grinding Wheel Co., 180 Lafayette St., New York 13.

Abrasives, Aluminum Oxide

Allied Industrial Products Co., 620 N. Michigan Ave., Chicago 11.

Carborundum Co., Niagara Falls, N. Y.

The Cleveland Tool & Supply Co., 1427 W. 6th St., Cleveland 13.

E. I. Du Pont De Nemours & Co., Inc., Wilmington 98, Del.

Foote Mineral Co., 12 E. Chelten Ave., Philadelphia 44.

Formax Mfg. Co., 3000 Bellevue St., Detroit 7.

General Abrasive Co. Inc., Niagara Falls, N. Y.

M. P. Iding Disc Grinding Compound Co., 3530 W. Pierce St., Milwaukee 4.

The Manderscheid Co., 810 Fulton St., Chicago 7.

Norton Co., Bond St., Worcester 6, Mass.

The Puritan Mfg. Co., Waterbury, Conn.

Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37.

Sommers Bros. Mfg. Co., 3439-41-43 N. Broadway, St. Louis 7.

Abrasives, Coated and Grain

General Abrasive Co., Inc., Niagara Falls, N. Y.

Abrasives, Sandblasting Sand (See Sand, Sandblast)

Abrasives Steel Shot and Grit

Allied Industrial Products Co., 620 No. Michigan Ave., Chicago 11.

Alloy Metal Abrasive Co., Huron St., Ann Arbor, Mich.

American Foundry Eqpt. Co., Inc., 412 S. Byrkit St., Mishawaka, Ind.

Beam-Knodel Co., 195 Lafayette St., New York 12.

Clayton-Sherman Abrasives Co., 3896 Lonyo Rd., Detroit 10.

Dreisbach Engineering Corp., 85 Warburton Ave., Yonkers 2, N. Y.

Harrison Abrasive Corp., Merchants Bank Bldg., Manchester, N. H.

Industrial Metal Abrasive Co., 1601 Wildwood Ave., Jackson, Mich.

Metallizing Co. of America, Inc., 1330 W. Congress St., Chicago 7.

Metallizing Engineering Co., 38-14 30th St., Long Island City 1, N. Y.

Parsons Engineering Corp., 2549 E. 79th St., Cleveland 4.

Philadelphia Steel Abrasive Co., Vandalia & McKean Sts., Philadelphia 48.

Somers Bros. Mfg. Co., 3439-41-43 No. Broadway, St. Louis 7.

Frederic B. Stevens, Inc., 510 Third St., Detroit 26.

Pittsburgh Crushed Steel Co., 4839 Harrison St., Pittsburgh 1.

Abrasive Wheels (See Grinding Wheels)

Absorbents, Oil, Liquid

Oil-Dri Corp., 520 N. Michigan Ave., Chicago 11.

A. J. Stull & Co., 4420 Paul St., Frankford, Philadelphia 24.

Acetylene

Air Products Inc., Box 538, Allentown, Pa.

Air Reduction Sales Co., 60 E. 42nd St., New York 17.

Linde Air Products Co., 30 E. 42nd St., New York.

National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6.

Acid-Proof Linings or Cement

Ceilcote Co., Rockefeller Bldg., Cleveland.

National Lead Co., 111 Broadway, New York.

Activated Carbon

Carbide & Carbon Chemicals Corp., 30 E. 42nd St., New York 17.

du Pont de Nemours & Co., E. I., Inc., Wilmington 98.

Enthone, Inc., 442 Elm St., New Haven 11, Conn.

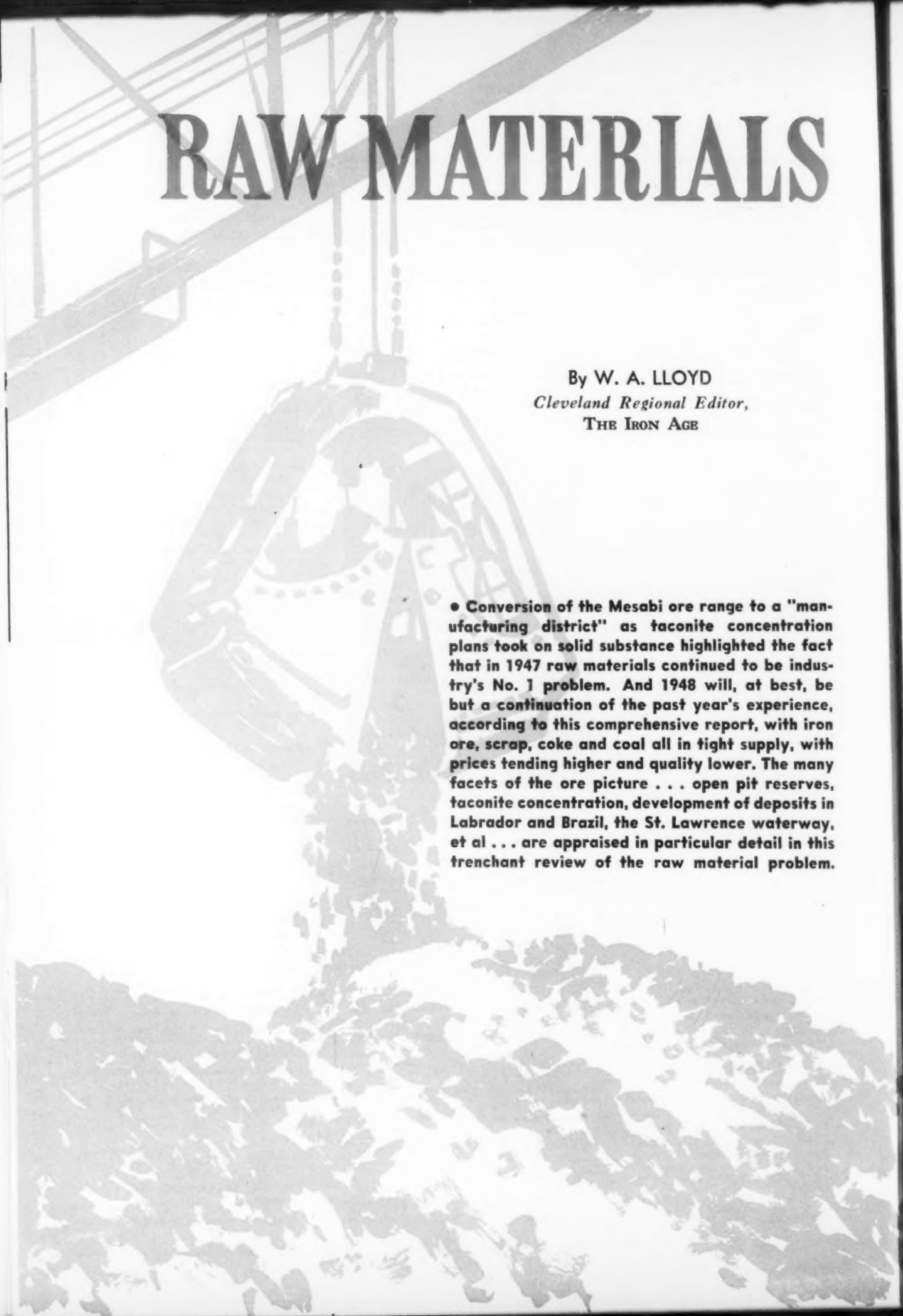
Hanson-Van Winkle Munning Co., Matawan, N. J.

Adhesives (See Cements and Adhesives)

(Continued on Page 284)

RAW MATERIALS

By W. A. LLOYD
Cleveland Regional Editor,
THE IRON AGE



• Conversion of the Mesabi ore range to a "manufacturing district" as taconite concentration plans took on solid substance highlighted the fact that in 1947 raw materials continued to be industry's No. 1 problem. And 1948 will, at best, be but a continuation of the past year's experience, according to this comprehensive report, with iron ore, scrap, coke and coal all in tight supply, with prices tending higher and quality lower. The many facets of the ore picture . . . open pit reserves, taconite concentration, development of deposits in Labrador and Brazil, the St. Lawrence waterway, et al . . . are appraised in particular detail in this trenchant review of the raw material problem.

still a No.1 problem

IRON ORE, which has the steel industry between the devil and the deep blue sea, or possibly in more realistic terms between taconite beneficiation and the St. Lawrence waterway, is the most important yet least immediate of the steel industry's raw material problems.

Because of World War II, and the pace of postwar steelmaking, high grade open pit reserves in the Lake Superior district are in a depleted state, and if iron ore consumption continues at the present rate (approximately 7 million tons a month), the end of the big pits is in sight.

This brings into sharp focus a project of considerable promise and colossal cost, the taconite beneficiation program, which lies close to the heart of the Lake Superior iron ore industry.

Ignoring for a moment the assorted estimates of total reserves of the Lake Superior district, iron ore reserves are not in the hands of consumers in proportion to their needs, which is the second problem of the industry.

The first problem is the lack of ability to get out big tonnages in case of another national emergency, which has led to recommendations that iron ore should be stockpiled, etc., etc.

Taconite beneficiation is thought by some of its exponents to be the panacea for all future iron ore ills, and by others to be an economic folly. Taconite concentrate, even if available in the tonnage required, means higher priced steel. And this, if nothing else, will stir the development of new sources of high grade iron ore which will be necessary to maintain the steel capacity centered around the Great Lakes.

And despite the wide divergence of expert opinion on the economic feasibility of taconite beneficiation (in a economy pegged to steel), there are two points of quasi-agreement: First, taconite is the only major alternative source of supply to replace the high grade superior ores for the Lakes' steel capacity; second, if taconite is not successfully developed, foreign sources of supply will have to be heavily depended upon.

Demonstrating that practice and theory sometimes end off at the same place, Charles M. White, president, Republic Steel Corp., and Marvin Barloon, professor of economics and business, Western Reserve University, have both warned that the Lakes' steel industry may have to move soon to the Atlantic and Gulf Coasts to handle imported iron ore.

Competitive bugaboo of the taconite beneficiation program is the St. Lawrence Seaway, the route to the blue water, construction of which seems certain sooner or later after years of dangling in debate. One of the principal commodities which will move through the waterway is iron ore, an item not given much attention in discussion of waterway traffic until recently.

There is little doubt among informed segments of the steel industry that consumers are going to see a large increase in iron ore from outside sources. The big deposit in Labrador has interesting possibilities, but the climate is tough, there's a 400-mile rail haul to water, and the seaway is still a paper project.

But part of the extra iron ore tonnage required to meet steel production soaring to 90 million net tons yearly will be made up from outside sources.

In the meantime, the Lake Superior district had its biggest peacetime year in history in 1947, (77,898,087 gross tons shipped) and much is being done to open up what deposits of high grade ore that are left. The industry is proceeding with beneficiation programs. The industry has known for a long time that the big open pits couldn't go on forever.

Scrap market conditions in 1948 depend upon the rate of steelmaking operations which will probably parallel 1947 at least for the first 6 months, and the release of war-generated scrap, from War Assets Administration warehouses at home and the return of material from abroad, which does not look too promising. Prices will probably follow the ups and downs of 1947.

Coke, despite new capacity and the help of aging beehive ovens, will be in short supply all or most of 1948. Some easing may be in order toward the end of the year, and probably higher costs.

Coke, scrap and iron ore are bound by ties of economic blood. The coke shortage is induced by the terrific pig iron shortage, which in turn is induced by the shortage of scrap. In iron ore and coal, the steel industry is faced with the

problem of dealing with lower grade materials at higher costs. At the same time, some experts believe that the United States will not be a scrap plus nation for the next 5 years, which from the supply and demand point of view should mean higher scrap prices.

The battle to combat the qualitative downtrend in natural resources of raw materials will undoubtedly be reflected in future steel prices.

Mesabi "Manufacturing District"

In 1947, the much heralded mutation of the Mesabi Range into manufacturing district got under way as Erie Mining Co., Reserve Mining Co., and Oliver Iron Mining Co. revealed plans for the construction of beneficiation plants.

Erie Mining Co., managed by Pickands, Mather & Co., is proceeding with the construction of a preliminary pilot plant designed to treat approximately 1800 gross tons of material per 24-hr day, involving an annual production of finished concentrate of about 175,000 tons to 200,000 tons, if the plant is operated continuously, and the mining of as much as 600,000 tons of crude taconite a year.

Erie's plant will simulate, as far as possible, operational conditions in a large commercial plant and, except for the fact that primary crushers will not be installed, the equipment is generally the same size and character as contemplated for a full-sized commercial plant.

Reserve Mining Co., managed by Oglebay, Norton & Co., is planning a four-unit beneficiation plant, near Beaver Bay on the north shore of Lake Superior, capable of producing 10 billion tons of taconite concentrate annually. Plans for the construction of the first unit, which will have an annual capacity of 2,500,000 tons of taconite concentrate annually, are practically completed. Construction will require 4 or 5 years, largely because of the difficulties in obtaining equipment. Cost will run about $15 per annual ton.

Taconite will be fed directly from railroad car to primary crusher, which will handle pieces up to 4½ ft diam. The material will then pass through additional secondary crushers into rod mills, over magnetic separators, wash boxes, surge tanks, filters and then to the agglomeration plant. Tailings will be poured into Lake Superior.

Taconite plants require lots of water and electricity, and it is estimated that 40 tons of water and 70 kw are required for each ton of sinter or agglomerated material.

According to Oglebay, Norton & Co. spokesmen, there is some economy in a two-unit plant, (which may stem from the copper industry's experience) since a plan of this size requires 1800 to 2000 employees, as compared with 1200 for a single unit. But the limiting factor in the size of beneficiation plants, apart from everything else, is the size of the crusher.

A number of beneficiation plants have been built to serve Minnesota iron ranges containing principally low grade hematite iron ore. In 1947 there were 47 such plants, which handled about 12 million tons, but none of these plants were operating on taconite.

Almost simultaneous with Pickands, Mather & Co.'s announcement, U. S. Steel's almost-mute subsidiary, Oliver Iron Mining Co., announced a $34 million program of research, construction and expansion of iron ore beneficiation in the next 6 years. First step was the expenditure of more than $2 million in the construction of two beneficiating plants.

Lake Superior district reserves of merchantable iron ore were estimated in St. Paul, June 30, 1947, at 2 billion long tons and sufficient to sustain operations for 40 years, by William H. Crago and Hugh M. Roberts, before ICC examiners as expert witnesses for Great Northern Ry., a defendant in an action before ICC by Butler Bros., towards a reduction in the rail freight rate on beneficiated iron ore.

Mr. Crago testified that he had conducted a survey of iron ore reserves in the Lake Superior district region and estimated that on May 1, 1945, there were approximately 2 billion long tons of merchantable ore in the district. He added that "this is a conservative figure that more detailed studies will only serve to increase."

Mr. Roberts asserted that there has been "no appreciable decline in the grade of Lake Superior iron ores. With an average annual rate of production of 50 million tons, which in my judgment will be the probable demand, the 2 billion ton reserve will sustain operations for 40 years in the Lake Superior district, permitting ample time to get fine grinding methods or other techniques under way on the additional low grade ores and iron formation. This is on the assumption that there is no more than 2 billion tons of merchantable ore available."

Steel Capacity Increase Necessary

On the other hand, Cyrus S. Eaton, a director of Cleveland-Cliffs Iron Co., chairman of the board of Portsmouth Steel Corp. and Steep Rock Iron Mines Ltd., told THE IRON AGE recently, with considerable candor: "Most steel company management is reluctant to admit it, but steel capacity must be increased. The crying need is not for more finishing facilities, but for additional blast furnaces, to produce pig iron both for openhearth and foundry use. When the necessity for more pig iron is, as it will have to be, finally conceded, a sharp and not presently contemplated shortage of iron ore will promptly rear its ugly head.

"I say ugly because it takes time to bring new open pit iron ore mines into production; it takes still more time for underground mines, and nobody knows how long (not to mention how much money) it will take to arrive at satisfactory methods of beneficiating taconites and jaspers.

"Moreover, you cannot open mines if you do not have ore. Two or three steel companies are well-heeled with fairly high-grade reserves, but the other blast furnace operators of the United States and Canada, in steel companies and outside, are shockingly short of good and readily accessible iron ore. In fact, some companies whose annual consumption is high do not have more than a hatful of iron ore. There is no use counting on ore geographically so remote as not

to be available this generation. Beneficiation of taconites and jaspers, with whatever speed it comes, is also a long way off.

"Blast furnace operators had therefore better begin taking their future supplies of iron ore with the utmost seriousness. Just because they have always been able to buy all the ore they wanted they cannot afford to assume that this will continue to be the case forever. If they do, they are destined for a rude awakening."

In this regard, it may be significant to note that most consumers of iron ore would have had some difficulty in buying additional tonnage for winter consumption at the close of the 1947 season.

Other surveys indicate that reserves of open pit direct shipping ore will be pretty well depleted in about 19 years, or about 1966, based on a rate of consumption considerably lower than the present 7 million tons a month. Discovery of new deposits or extensions of existing deposits may lengthen the life of the big pits somewhat, but concentrates will be coming in by the early fifties.

Based on the projections of Oglebay, Norton & Co., 4 million tons of concentrate will be coming down the lakes in 1953; 5 million tons in 1954, and by 1964, about 19 million tons of concentrate will be taking up some of the slack in high grade open pit reserves.

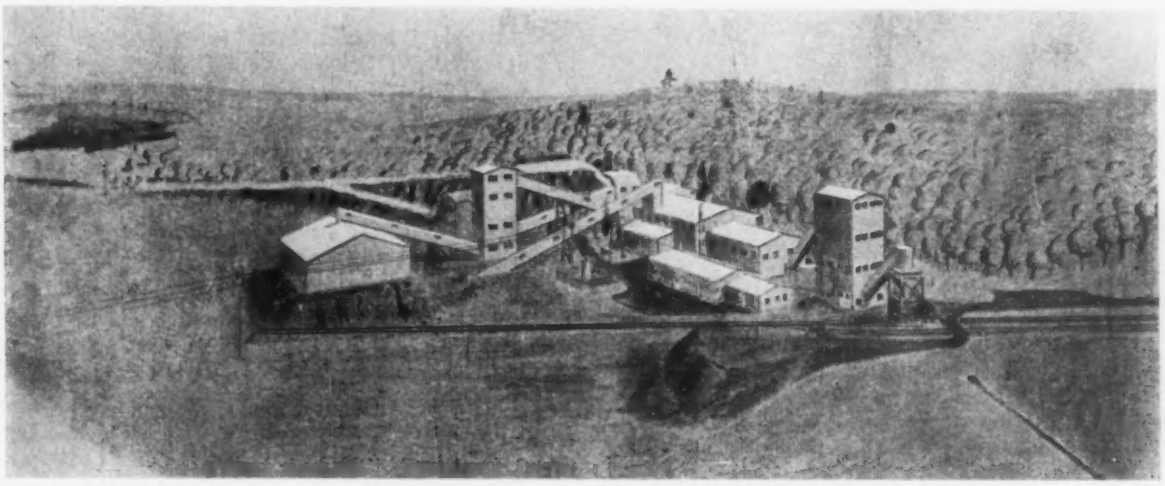
However, according to George W. Hewitt, assistant vice-president in charge of operations, Wheeling Steel Corp., and resolute protagonist of taconite beneficiation, seaborne imported ores cannot be used by the present steel plants of the United States on a basis competitive with domestic ores except to a small degree.

In a speech before American Iron & Steel Institute, May 1947, Mr. Hewitt pointed out that the economic use of these imported ores is limited to those steel plants which are on or near the seacoast.

"Imports of iron ore and magniferous iron ore are equivalent to only 3 to 5 pct of our domestic production. As long as present conditions affecting imports are not changed, it is reasonably accurate to use these percentages to measure the part of our steel industry, as now established, which can be supplied by imported ores.

"As to the chemical quality of Lake Superior iron ore in the future, we shall probably not lose much on the iron content, but quite possibly may expect an increase of 1½ to 2 pct in the natural silica, this being mainly due to larger tonnages of retreat and marginal ore to be washed or jigged or separated by high gravity," Mr. Hewitt declared.

"It is not an uncommon impression that Lake Superior iron ore has deteriorated somewhat in quality over the years, but for the preponderant grade of low phosphorus nonbessemer, this is true only in comparison with the short early period of 1902-09. The average iron content in the 6 years, 1940-45, was slightly higher than in the previous 38 years of 1902-39 and the phosphorus was lower, with the silica only slightly higher . . .



ARTIST'S conception of Erie Mining Co.'s preliminary pilot plant for the beneficiation of taconite. Plant is designed to treat approximately 1800 gross tons of material per 24-hr day. Illustration courtesy Pickands, Mather & Co.

"But," said Mr Hewitt, "we do not expect this condition to continue. In our blast furnaces we shall have to handle silica quite a bit higher in the ore and this will be true also of beneficiated intermediate ore and taconites. Alumina will be lower, which also will present problems in economical blast furnace operation. But others believe that in the near future iron ore from other districts will lessen the need for Lake Superior iron ore."

According to the Industry Report, "Domestic Transportation," prepared by Paul M. Zies, acting chief of the Bureau of Foreign & Domestic Commerce, Dept. of Commerce, there are a great many ore deposits in other countries, but not many which are large enough to supply the Lakes area steel plants for even as much as 1 year.

"In addition, most of the deposits are either low in iron content, contain impurities difficult to eliminate, are uneconomically distant, or lie deeply underground. Moreover, development of

foreign ores involves difficult political questions since some countries are reluctant to permit exploitation of their reserves by foreign capital."

The report notes that with the exception of 1 billion or 2 billion tons of ore in Sweden, most of the European ores would necessitate extensive alteration of United States blast furnaces before they could be used.

"African ores are greatly distant and some uncertainties exist both as to their size and iron and impurities content. Indian ores are extensive and of good grade but are far distant. The Philippines have large deposits, but they are reportedly of low quality. Closer . . . are the Wabana deposits in Newfoundland, estimated at 3 billion tons, but lying under water and having a high phosphorus content. The Newfoundland ores, however, could be used if the industry adapted its furnaces to handle this type of ore."

Foreign Ore Deposits Studied

The deposits which seem to offer the most promise are those in Labrador and Brazil, both high grade open pit ores. Smaller quantities could be made available from Cuba, Venezuela, and Chile. However, incomplete data are available on the recently discovered Labrador deposits. According to the Canadian Bureau of mines, all indications point to the existence of vast reserves of ore, possibly comparable in quantity and grade to those of the Mesabi Range.

A study prepared by Canadian Bureau of Mines in 1946 reports that general conditions for low cost operation are "exceptionally favorable." The general conclusions were as follows: The Labrador ore is of exceptional quality, can be mined at unusually low cost and can be transported to a St. Lawrence port at moderate cost; there is an immediate market of important dimensions along the Atlantic seaboard of the United States and Canada where the short voyage and return cargoes of coal will give it an advantage; in British and western Europe the Labrador ore will meet keen competition from Swedish ore; the largest potential is in the area served by the Lake Superior mines. It may be possible to serve this to some extent by means of the small vessels that now use the St. Lawrence canals. When the St. Lawrence deep waterway is completed, the cost of delivering Labrador ore to buyers in Pennsylvania and Ohio should not be greatly different from the cost of delivering Lake Superior iron ores.

"If the Labrador developments do not prove as productive as many mining experts now anticipate, other sources of foreign ore will have to be developed . . . and transportation costs will be increased substantially," the report stated.

In the case of the Labrador deposits, a railroad is planned which would terminate near Seven Islands on the Gulf of St. Lawrence. Since this area consists of relatively sheltered water, there appears to be no reason why existing lake freighters or vessels of similar design, but possibly strengthened somewhat, cannot be employed for the entire movement from Seven Islands to Erie ports. Total time for a complete voyage should not exceed 10 days.

Information received from a variety of sources indicates that the total cost, including capital costs, of operating the largest lake freighters ranges from $1400 to $1800 a voyage day and from $1100 to $1500 for each day spent in port. Assuming that the freighters carried 15,000 tons of ore and returned in ballast, the actual cost of the water transportation from Seven Islands to Cleveland, exclusive of unloading charges, would be from $1.00 to $1.20 a ton. Including the existing unloading charge of 18¢ absorbed by vessels, a rate from $1.20 to $1.40 would be possible, which is not significantly higher than the present rate for iron ore shipments from the head of the lakes to Lake Erie ports.

The report "Domestic Transportation" also touched on this matter. "If it is necessary to import ore from a distant source of supply, such as Brazil, the water transportation charge will be considerably greater . . . in connection with movement of this character, there is a strong probability that an actual transshipment of the ore would take place at Montreal or some other St. Lawrence river port . . . ocean vessels will be able to ascend the seaways but the depth limitations are such that very large ore carriers would be unable to carry full loads," it was pointed out.

"Bethlehem Steel Co. has found that the most economical water transportation for ore can be achieved through the employment of huge ore carriers capable of carrying nearly 25,000 tons of ore and drawing 34 ft of water . . . Bethlehem boats or boats of similar proportions draw too much water for successful use through the seaway. Accordingly the shipment of ore in vessels of great cargo carrying capacity from overseas sources into the Great Lakes would require either the development of a radically new type of ore carrier comparable in dimensions and draft to the lake carriers, and capable of withstanding ocean storms, or as an alternative, a transfer of ore at Montreal or some other St. Lawrence River port," the report explains.

Cost of Ocean Shipments

Shipments from Brazilian ports to Baltimore with a return in ballast would involve a total cost ranging between $2.00 and $2.50 a ton. The water haul from Montreal to Cleveland is considerably shorter than that from Seven Islands to Cleveland and should not consume more than 6 days for the round trip including time spent for loading and unloading. Accordingly, the actual cost per ton of this water shipment with a ballast return would range from 60¢ to 70¢. Delivered cost of South American ore at Lake Erie ports, exclusive of tolls charged for use of the seaway, would be from $1.15 to $1.50 a ton higher than delivered costs at Atlantic ports, such as Baltimore.

"Under such circumstances, if resort to Brazilian ore is necessary, it is possible that shipments to the Pittsburgh area might terminate at

Atlantic ports and move westward by rail . . . steel plants located at the lake cities, however, would still find it more advantageous to use the seaway rather than to haul ore westward from Atlantic coast ports, since the total additional water charge would be much less than the cost of rail transport from the coast.

"The foregoing analysis of transportation charges is not meant to be precise, but is intended rather to show in a general way the relative advantages and disadvantages involved in utilizing the seaway. All of the costs presented were based on the most uneconomical operation possible, namely, voyages in which there was no return cargo."

On the other hand, an argument that construction of the St. Lawrence waterway would delay installation of equipment to beneficiate Lake Superior low grade ores was placed before the Senate Foreign Relations Subcommittee last summer by Alexander C. Brown, president, Cleveland-Cliffs Iron Co. He said that the Lake Superior iron ore industry will be able to produce large tonnages of ore for an almost unlimited time by concentrating taconite.

Earlier, W. Averill Harriman, Secretary of Commerce, had testified that as much as 40 million tons of foreign ore would be shipped through the St. Lawrence waterway annually.

According to Mr. Brown's testimony, it would not take many millions of tons of iron ore produced by cheap labor and transported in foreign ships to seriously disturb market conditions for Lake Superior iron ore. Furthermore, the uncertainty which the St. Lawrence product would inject into the iron ore situation would tend to delay the taconite program.

"As producers of iron ore from the Lake Superior region, who expect to keep on producing iron ore, and eventually produce high grade concentrate and jasper as well, we see in the St. Lawrence waterway only a threat to the normal expansion and development of our industry, to the shipping dependent on it and to the whole economy of the Great Lakes region," Mr. Brown emphasized.

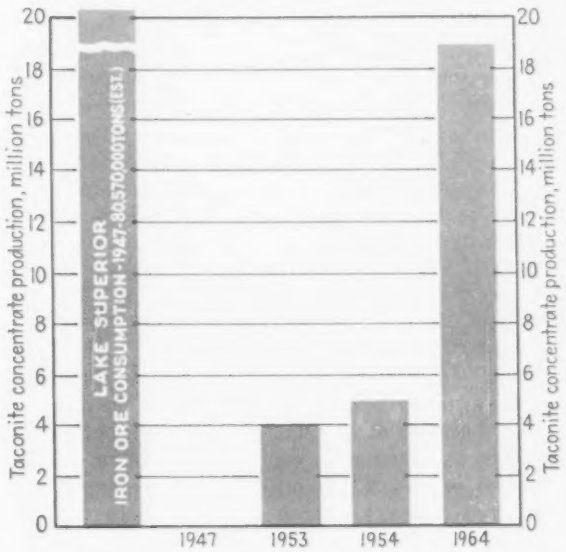
Perhaps the most provocative pundit of the steel industry's future and iron ore is Marvin Barloon, professor of business and economics, Western Reserve University, Cleveland.

Prof. Barloon, prophet of doom for the Lakes steel industry, takes the position that the strategy of the industry, by necessity, is one of retreat. Taconite processing will add permanently to the cost of steel . . . the rigid capacity of this new industry will demand a public policy having in view the varying need for steel in war and peace," he said.

"The United States will need much more steel than can be obtained from taconite . . . a new steel industry will have to be built along the Atlantic and Gulf coasts."

Prof. Barloon notes a divergence of opinion as to whether or not we shall continue making steel at the present rate very long—"but if we are able to achieve our national purpose of maintaining high production and employment, we shall . . . need steel in quantities very close to the present rate.

"The engineering and financial problems of refining taconite are so discouraging that this mineral is certain to be only a partial solution, and an expensive one at that . . . in order to provide a flow of ore equivalent to the lake shipments of 1946, nearly a half billion dollars would have to be sunk in the mine developments, plant inventories and operating funds," Prof. Barloon stressed. "The mining executives would have to induce 25,000 to 35,000 workers and their families, altogether perhaps 60,000 people, to move to the Mesabi Range. The aggregate investment would expand the steel industry as a whole 10 pct without increasing its output a single billet."



A COMPARISON of projected production of taconite concentrates and current Lake Superior iron ore consumption.

Prof. Barloon predicts that whether or not the taconite smelting industry is set up on so big a scale, inevitably it will be highly rigid in capacity . . . but demand for steel in America has traditionally been very uneven. The steel industry and the American public are already heavily burdened with the fixed costs of our colossal steel plant: Interest, depreciation and insurance, costs which continue undiminished in the years when little steel is made. The taconite industry would have to carry all these costs and also would be saddled with a fixed cost for labor . . . every new plant in the taconite industry will be a hostage to high employment and steady production.

Apart from the great investment, present methods of processing taconite are very costly. The studies of Prof. E. W. Davis, University of Minnesota, indicate that the best processes now known would add over 10 pct to the cost of pig iron . . . the new pilot plants will doubtless uncover economies, but drastic reductions in costs seem unlikely.

In 1947 the scrap market was a raw material dilemma of considerable dimensions, baffling but

none the less profitable to members of the scrap industry, and a terrific headache to steel mill scrap buyers.

Looking back at it, out of the melee of new orders, old orders, skyrocketing prices, cancellations and customer scrap, three salient points emerge: Who drove the scrap market up? Who kept the market up? And what's going to happen to it in 1948?

The market in 1947 marked an all-time high, not only in prices, but in sensitivity, manifestations of a couple of abnormal market factors, the ingot makers who had to have material or shut down, and the big steel consumer who was compelled to step into the scrap market and buy one of the raw materials for his steel. The ingot maker was a constant factor in the market; the "consumer-buyer" was not; his purchases were sporadic but at prices out of this world.

Many of the fantastic prices paid by "consumer-buyers," whose roster could include some of the proudest industrial names in the land, will never be known. He placed his orders with a broker or a big dealer, who kept his mouth shut, parceled out the order in the right places, took the pick and occasionally the bulk of the free tonnage, which, if nothing else, is the essence of free enterprise.

The "consumer-buyer" was the customer of producers with spare ingot capacity, who in some cases, because of the nature of their operations, are not in position to request the return of earmarked scrap. Their only source of supply was the free tonnage, which quantitatively was always too thin for price stability in 1947.

To a considerable extent, electric furnace capacity was used in conversion operations, which drained off large tonnages of the foundry grades, the plate scrap, punchings, and the structurals; mills themselves took the rest on an earmarked basis.

Many big scrap users today, including some steel mills, have no direct consumers from whom they can request the return of their scrap. These operators must have scrap or close down, and with the pig iron situation tight as a drum, they pay the high dollar to get the bulk of the free scrap. Probably the only way this practice could be stopped is by mills refusing to convert the ingots produced by these operators.

New By-Product Coke Capacity

COKE OVENS UNDER CONSTRUCTION

Company	Location	Ovens
Bethlehem Steel Co.	Sparrows Point, Md.	61
Wheeling Steel Corp.	Wheeling, W. Va.	106
Jones & Laughlin Steel Corp.	Aliquippa, Pa.	106
Dominion Steel & Coal Corp.	Sydney, Nova Scotia, Can.	53
Crucible Steel Co.	Midland, Pa.	63
Carnegie-Illinois Steel Corp.	Clairton, Pa.	146
Pacific Steel Co. (Chile)	Concepcion	57

PLACED IN OPERATION WITHIN 1947

Carnegie-Illinois Steel Corp.	Clairton, Pa.	87
Tenn. Coal, Iron & RR.	Birmingham, Ala.	63
Weirton Steel Co.	Weirton, W. Va.	106
Montreal Coke & Mfg. Co.	Montreal, Canada	15
American Rolling Mill Co.	Hamilton, Ohio	25
Crucible Steel Co.	Midland, Pa.	21

In general, the high prices in the scrap market were sustained by steel mill buyers who bid freely against each other, cross hauled and exhorted their brokers to greater efforts as furnace inventories dwindled.

Lip service to the contrary, mill buyers seldom stuck together in 1947 for longer than it took to get to a telephone, and no sooner were rumors of a new "policy" percolating through the trade when the horse trading began in earnest. On several occasions, the antics of buyers, brokers and dealers made the period of OPA price control seem tranquil indeed, in their efforts on one hand to circumvent supply and demand, and on the other hand to augment it.

Erratic Scrap Price Movements

Role of the mill buyers in keeping high prices going is readily apparent in a blow-by-blow resume of the price peaks and pits of 1947.

At the end of 1946, prices were firm. Many mill buyers had hoped that the return of free markets would mark the end of long hauls on scrap, but remote shipments were still common market practice. The familiar story of dealers holding back shipments in December for income tax purposes was widely disseminated and consumer resistance to higher prices ($32.50 Pittsburgh) was heavy. Buying of remote material wherever it could be found continued and began to dry up local consuming market quotations, and prices began rising.

About the middle of February, openhearth grades advanced strongly up to $2.50 a ton increases in almost all major markets. Most brokers were short, as the price in Pittsburgh reached $36 for No. 1 heavy melting, and fierce interdistrict competition threatened to drive prices higher. The scramble was still under way the middle of March, and openhearth material was bringing $41 Pittsburgh.

Trade sources began to hope for the introduction of large war surplus scrap lists and battlefield scrap into the market to reverse the price spiral. In the confusion of a very complex market, two facts were apparent: Shipments were higher and so were prices. Weakening prices were first reported Mar. 27, and brokers were ready to take 60-day orders.

Strong consumer resistance backed by the best inventories in months forced prices down the first of April, mills had pulled out of markets and cross-hauling of earmarked scrap continued, but the willingness to buy almost anything anywhere at any price, even though it meant raising a competitor's normal buying area had virtually disappeared.

Only cast grades were showing firmness by the middle of April, and No. 1 heavy melting was quoted at $39 Pittsburgh. Good shipments and the absence of mill buying continued to shake loose many a ton of scrap, but foundry grades were still in weak supply and demand was strong. Malleable was stronger than ever, bringing $50 at Cleveland and Chicago. The week of Apr. 24 saw the scrap market break sharply in practically all consuming centers, and at Pittsburgh, heavy melting prices dropped $5.25, one of the biggest

nosedives in history. Optimists saw in this price break an indication of a more normal steel market in months to come.

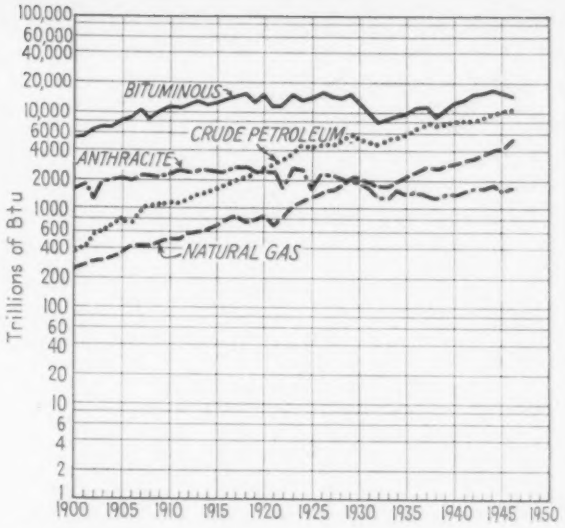
April ended along with many steel mill scrap buying contracts, which posed the question as to how many of the low-priced orders would be delivered. Early in May, cast grades had one of their rare, soft periods. By the middle of the month, No. 1 steel was bringing $30 at Pittsburgh, and a "where do we go from here attitude was evident in some sectors of the trade; stability and eventual stiffening were in the wind. Here it was that some buyers tried to drive the price down too far. A market jump of $2.50 a ton in Pittsburgh heralded the rebirth of scrap price strength, at the end of May dealer offerings were light and by the middle of June, the market undertone was very firm.

Prices began to move upward and revival of cross-hauling was suddenly under way, and sharp advances were registered at Chicago and Detroit. By July 17, No. 1 heavy melting was moving at $39 Pittsburgh and the market was exhibiting every evidence of inflationary trends, and by July 31, heavy melting steel prices moved upward again and carried THE IRON AGE scrap composite to $41.75 on Aug. 7, an all-time high; a year before it had been $19.17. The week of Aug. 14 saw the price drop for the first time in 3 months, and then began a period of price stagnation in almost all markets, but the stockpiling picture was gloomy and worsened by blast furnace repair programs.

Heavy Melting Scrap Hits $42

By the end of September, heavy melting steel grades were still prolonging the record-breaking pause of approximately a month at the same levels. Following a period of price testing, small increases were registered in some markets, and Pittsburgh brokers were unable to cover $38 orders for less than $40. But the market was moving upward. While many major consumers withdrew abruptly from the market the latter part of October, THE IRON AGE scrap composite hit a new high of $42.58 the week of Oct. 30. As the sharp upward trend was arrested, a number of mills moved back into the market, but sales at lower levels could not be considered any indication of a long-term easing of the scrap picture, but a determined effort on the part of mill buyers to bring the market down was in the offing. First shot was the announcement that outstanding high-priced orders would be closed Nov. 22, and a quasi-mass attempt to buy on a basis somewhat similar to the old OPA methods, plus about $20, was made, but broker covering was lending the market strength. Brokers shipped up on most of their orders, and customer scrap was moving at the "formula" prices, but another period of pyrotechnics and spectacular prices was lurking close at hand.

This was the scrap market in 1947. In essence, it was a scrap market never completely without a strong undertone and prompted by the immutable laws of supply and demand, the market "wanted" to go up, the inevitable result of strong demand and weak supply.



COMPARISON of use of various types of commonly used fuels, expressed in terms of Btu's. Data from National Coal Assn.

The report of the Secretary of the Interior, "National Resources and Foreign Aid," is tangible evidence that the government is aware, at least, of the steel industry's most acute raw material problem, the shortage of scrap.

Certainly the scrap outlook is not encouraging. Potentials include the 147,000 tons which the Canterbury Corp., Delaware, has coming, but none of which has been delivered thus far; about 275,000 tons which the Army will sell on sealed bids about April or May in this country. In addition, there are some 250,000 tons the Army has abroad, mostly in usable vehicles, trucks, jeeps, etc., which will be turned over to the Foreign Liquidation Commission for sale to the German government, or what passes for it, and out of this material might come anywhere from 50,000 tons to 250,000 tons of Army-generated material.

There is little to be gained from farm and home drives, since these sources were pretty well cleaned out during the war, and most peddlers and collectors, spurred by the high prices, have probably completed the job. There is not a great uncollected total, and any salvage drive would bring mostly inferior scrap, light material, which already has the mills squawking. Furthermore, it is doubtful if such a drive would be successful, without the impetus of wartime.

Some weeks ago, a British industrial expert, a woman, made the statement in this country that there is between 3,500,000 and 5,000,000 tons of scrap in Europe, mostly in Germany. The British have already bought about 1 million tons of this material, but only a trickle has found its way through Hamburg to date.

Whether United States buyers, or consumers' representatives can compete for this material, which is the property of the German government, or what passes for a government is very doubtful, because of the ocean freight. A commission from this country is being selected now.

Most of the surplus material in the Pacific theaters has been turned over to the Chinese and Philippine governments, but the Navy has 15,000

to 20,000 tons to offer at Guam, in January, which is just about the only tangible scrap offering available at the moment. There's an estimated 150,000 tons at Manila, either on the ground or underwater.

The rumor is also afoot that as a result of pressure for the Marshall Plan scrap, the United States may inform European countries that "to help you out we aren't going to take much scrap out of Europe, but we won't export any to you."

Presupposing steel production is on a level with 1947, the tonnage of production scrap in 1948 will be approximately as great as 1947; the tonnage of railroad scrap will be about the same as 1947, around 3 million tons, which is pretty well a standard figure. Shipbreaking will probably continue through most of next year at about the present rate, 75,000 tons a month, maybe less; some shipbreakers on the gulf are running out of ships. Auto graveyards should yield more than in 1947, but this is hard to estimate.

Under such circumstances, scrap exports will probably be neither possible nor permitted.

One of the leaders of the scrap industry told THE IRON AGE recently:

"The outlook for scrap during the coming year is nebulous and vague, and as conditions are now, it is not encouraging. However, the outlook to place it on the encouraging side could be met if certain things would take place, which certainly should take place, as follows:

"(1) The War Assets Administration should immediately offer for sale approximately 2 million tons or more of scrap.

"(2) Return of the battle scrap and indigenous scrap now in possession of the Army in Germany, which would amount to about 500,000 tons, maybe more.

"(3) The releasing of scrap in the United States by the Army in the form of excess shells which the Army has indicated at 500,000 tons (at eight ordnance depots around the country) for first half of 1948.

"(4) A prompt return of approximately 500,000 tons from the Pacific area.

"(5) The continued scrapping of overaged vessels by the Maritime Commission (which has been yielding 75,000 tons a month) in addition to the scrapping of Liberty ships that are too expensive to repair—which may run to 500,000 tons or more.

"(6) The sale of old wrecked automobiles now in the hands of the auto wreckers which is easily 1 million tons.

"(7) The sale of used or obsolete material now in the hands of industry, including the foundries.

"In the past year 1947, the steel and foundry industries consumed approximately 53,127,000 tons, of which 27,731,000 tons were home scrap and 25,396,000 tons were purchased. If the additional 5,500,000 tons mentioned above from new sources would be properly placed on the market, this would add tons more scrap available for use by the steel companies and the foundries. Outside of the scrap from auto graveyards, which would be commercial source of scrap, the balance of this increase is strictly in the hands of the U. S. government. Both the steel industry and the various foundries, together with the scrap dealers and brokers, have exerted every effort upon the government agencies to get this material made available quickly, which if it were done, should alleviate those things mentioned in the foregoing as factors in making the outlook for the scrap situation in 1948 more encouraging."

In 1947, between 23 million and 24 million tons of scrap went to consumers, not only enough to maintain the terrific rate of steelmaking operations, but to add 1 million tons to inventory, and dealer stocks were pulled down only 50,000 tons. While mills have charged that scrap price increases do not bring commensurate scrap releases, if the price of scrap is high enough to keep the peddler on his wagon, this year should do the same.

Estimated Consumption of Iron and Steel Scrap and Pig Iron January Through December 1947

(Gross tons)

Month	SCRAP			Pig Iron
	Purchased	Home	Total	
January	1,949,000	2,426,000	4,375,000	4,497,000
February	1,872,000	2,148,000	4,020,000	3,988,000
March	2,185,000	2,401,000	4,586,000	4,478,000
April	2,222,000	2,369,000	4,591,000	4,289,000
May	2,275,000	2,450,000	4,725,000	4,448,000
June	2,343,000	2,286,000	4,629,000	4,323,000
July	2,114,000	2,129,000	4,243,000	4,024,000
August[1]	2,040,000	2,305,000	4,345,000	4,359,000
September[1]	2,096,000	2,217,000	4,313,000	4,222,000
October[2]	2,300,000	2,500,000	4,800,000	4,600,000
November[2]	2,100,000	2,300,000	4,400,000	4,500,000
December[2]	1,900,000	2,200,000	4,100,000	4,500,000
Total	25,396,000	27,731,000	53,127,000	52,228,000

[1] Preliminary, subject to revision.
[2] Estimated.
Source: Bureau of Mines. Norwood B. Melcher. Metal Economics Div.

Coke and Coal

Coal and coke comprise a curious anomaly in the steel industry's raw material group. There are tremendous coal reserves, yet the best coking coals are being depleted at a noticeable rate; the quality of coke is going down while the cost of coal is going up.

According to some experts, output from the industry's blast furnaces has been cut 8 to 10 pct by inadequate supplies of good grades of coke. On the other hand, some coke producers suspect that large exports of metallurgical coal have made it nesessary to use poorer grades in the making of coke.

It is also claimed that the increased mechanization of coal mining has raised the waste content in coal, thereby contributing further to the lowered quality of coke.

But some of the shortage of coke stems from the big wave of byproduct ovens built in the 1915-17 period, with a life expectancy of 20 years. But at the time when many of these ovens had passed their period of life expectancy, World War II came along. Many of these ovens should have been replaced 5 or 6 years ago.

As a parallel to the actual construction of new coke batteries, there is a great deal of coking facility modernization and rebuilding in progress. Many of the steel producers that have no plans for construction of new capacity are undertaking the rebuilding of existing facilities. There were 15,307 byproduct ovens in the United States at the beginning of 1947, some 3413 of which were from 28 to 35 years old, and a greater number between 15 and 28 years old.

Coke battery construction costs are up. A battery in 1917, according to one mill official, cost $1 million and that same battery today with technological improvements, especially on the byproducts, cost more like $3,500,000. Many byproduct coke batteries have been depreciated on a prewar basis and consequently it would cost $5,500,000 to build a battery that would yield 35 to 40 pct more coke than one built in 1917, according to steel officials.

At the start of 1947, total annual coke capacity of iron and steel companies was 60,280,000 tons (rated). Coke production in 1947 was very close to 55 million tons, and beehive coke ovens, most of which have a steel mill tie-up, produced between 5,000,000 tons and 5,500,000 tons of coke.

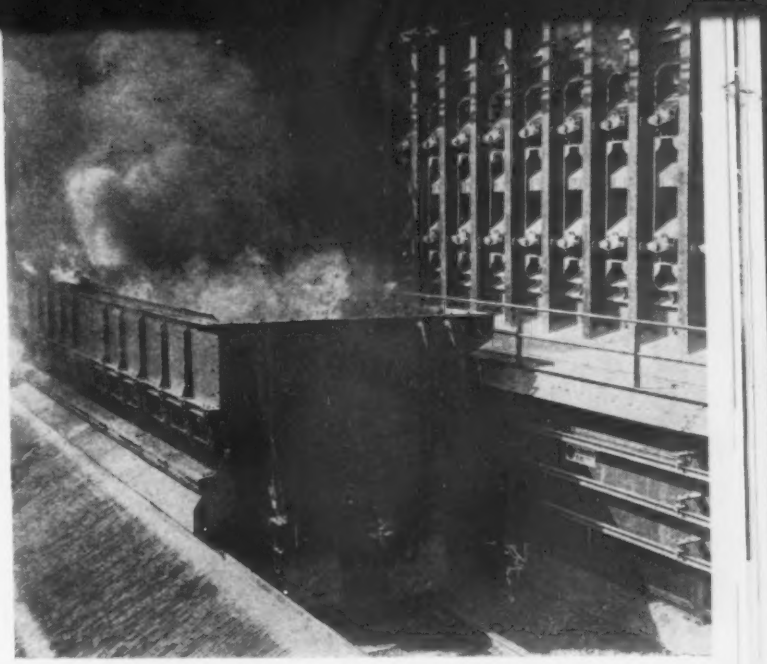
Present indications are, oven expansion plans to the contrary, that the beehive ovens will operate during 1948, despite the poor quality and the fact that the seams on which they are located have been worked out and coal must be trucked to them from other mines.

New byproduct coke capacity installed during 1947 served primarily to alleviate the overall shortage to some extent. U. S. Steel Corp. has plans for expanding its byproduct coke capacity 1,900,000 tons, and with other programs in the industry, total byproduct coke expansion is estimated by reliable sources to be in the general vicinity of 5 million tons.

But oven capacity is only part of the answer. Charles C. Russell, Koppers Co., research department, Kearny, N. J., told a meeting of the American Coke & Chemical Institute, that there are "still very ample supplies of coking coal, but the thick seams are being more rapidly depleted than the thinner seams. In addition, the quality of the reserves is getting poorer, for the 'good' coals are being more rapidly depleted. The latter may be in spite of mechanical mining what has caused an increase in the ash and sulfur of the coal."

Steel or coke producers are finding it necessary to invest in considerable mechanical mining and washing equipment to process coal that can be economically hauled to the blast furnace; while mechanization cuts labor costs, washing and blending costs money. Add to this the fact that most of the best tonnage of the good, economically located coking coals has been taken off. Higher coke costs are inevitable—but how much will be paid by the steel consumer is still indefinite.

According to Dr. Donald R. G. Cowan, Donald R. G. Cowan & Associates, consulting economists, to explain why coal prices have risen it is necessary to examine the costs of production and distribution.



PUSHING the first batch of coke from National Tube Co.'s new coke ovens.

"The coal industry's effort to mechanize its mine operations and thereby save labor expense has been long and persistent. Between 1918 and 1946, coal cut by machines increased from 57 pct to 91 pct of underground production. Between 1925 and 1946, coal loaded by machines increased from 1 pct to 58 pct of underground production. Strip mining increased from 1 pct of total production in 1918 to 20 pct in 1946. Of total production, 26 pct was cleaned mechanically in 1946 compared with only 4 pct in 1925."

Dr. Cowan's findings show this increased use of mechanical equipment has brought about a long steady decline in manhours required to produce a ton of coal, from 3.90 man-hr per ton in 1890 to 1.37 man-hr in 1945, a reduction of 65 pct.

In 1918, 615,000 men mined 579 million tons of coal, while in 1945, 383,000 men mined 578,000 tons, a reduction of 38 pct in men required for an equivalent output.

"From 1890 to 1917 this mechanization made possible a reduction of 27 pct in the real *labor* cost per ton, even though wages increased during that period. From 1917 to 1945, despite the reduction in manhours per ton from 2.20 to 1.37 or 38 pct, *real* labor cost per manhour increased 184 pct, offsetting the reduction in manual labor per ton." As a result of increasing wages the *real* labor cost per ton increased 76 pct from 1917 to 1945, according to Dr. Cowan's figures.

This indicates that since 1917 the industry, as a whole, has turned over to labor more than the whole of the advantage from mechanization, which has compelled prices to rise. Moreover, because labor cost is a major portion of total mining costs, (approximately 60 pct) expansion in volume does not bring about a substantial reduction in total cost per ton.

During the war, output increased rapidly yet total producing, administrative and selling costs per ton from 1940 through 1946 rose 88 pct at hand-loaded mines, 84 pct at machine-loaded mines, and 80 pct at strip mines.

The BASING POINT SYSTEM

By G. F. SULLIVAN
Pittsburgh Regional Editor
THE IRON AGE

• Attacked by the FTC, by bureaucrats and collegiate economists, the multiple basing point system of marketing steel still hangs on. Current stringencies have changed it a bit in spots but no one has proved there is a better method of marketing steel—for buyer and seller alike. It is here to stay, with modifications, unless the Supreme Court throws it out. But that decision is a long way off.

THE multiple basing point system may not be the ideal way of distributing steel in a seller's market. But no one has proved there is a better method of doing it in a buyer's market. Barring a Supreme Court decision in the current case, it is unlikely that the multiple basing point system will be abandoned.

It is true that many steel companies have been forced to withdraw from certain market areas because of high steelmaking costs. Why, they reasoned, should they sell in other producers' areas and absorb, or throw away, $4 or $5 a ton in freight? Total steel output is not much affected by such practices but net return is certainly higher. Unquestionably some consumers have been adversely affected by the tendency of mills to concentrate on markets closer to home.

Steel producers would like to see this boom go on forever. But they don't for a minute believe it will. They are increasing capacity and modernizing plants, yes. This is the production man's job, one that has been going on for years. But steel sales executives are constantly planning ahead for the days when they will have to go out and sell. They cannot have two systems—one for boom times, one for slack seasons.

The curtailment of some basing point operations, which the industry's customers are now feeling, will not be final. It is not a long term trend. It is a fair guess that when demand is again matched by supply, steel mills looking for business to keep operations rolling will be forced

Basing Points of Major Steel Products

The basing points listed below apply only to the sizes, grades, finishes and specifications of products produced at the points named.

	Ashland, Ky.	Baltimore	Bethlehem	Birmingham	Brackenridge, Pa.	Brooklyn	Buffalo	Canton, Ohio	Chicago	Claymont, Del.	Cleveland	Coatesville, Pa.	Detroit	Duluth	Dunkirk, N. Y.	Ft. Wayne, Ind.	Gary	Geneva, Utah	Granite City, Ill.
SEMIFINISHED carbon: Ingots—forging																			
Billets, blooms, slabs—rer				X					X								X		
Billets—forging				X				X	X		X						X		
Blooms—forging				X				X	X		X						X	X	
Slabs—forging							X		X		X						X	X	
Skelp																			
Tube rounds									X								X		
Wire rods				X					X		X								
SHEETS carbon: H-r, 18-ga & heavier	X			X			X		X		X						X		
H-r annealed, 19-ga & lighter				X					X								X		
Cold-rolled							X		X		X						X		X
Galvanized	X			X				X	X								X		X
Enameling									X		X						X		X
Long ternes																	X		
Electrical									X								X		X
STRIP carbon: Hot-rolled				X					X		X						X		
Cold-rolled									X		X						X		
Electrical, coils																			
Tin, terne, & blackplate				X					X								X		X
BARS carbon: Hot-rolled & small shapes				X			X		X		X						X		
Reinforcing (new billet)				X			X		X		X						X		
Reinforcing (rail steel)							X												
Cold-finished							X		X		X						X		
Merchant (rail steel)				X			X		X								X		
PLATES, STRUCT., carbon: Plates				X					X	X	X	X					X	X	
Floor plates									X								X		
Std structural shapes			X	X			X		X								X	X	
Wide flange beams			X						X										
Sheet piling									X								X		
Bearing piles			X						X										
RAILS, etc.: Light (new billet)				X															
Light (rail steel)																			
Track spikes				X															
Axles				X					X								X		
PIPE & TUBING: Pipe, all, incl. oil ctry.																			
Seamless mech. tubing								X	X				X						
Seamless press. tubing									X										
Mech. electricweld tubing						X			X		X		X						
ALLOY STEEL: Ingots								X											
Billets, blooms, slabs			X				X	X	X										
Bar shapes																	X		

	Houston	Huntington, W. Va.	Jersey City	Kokomo, Ind.	Lebanon, Pa.	Los Angeles	Lorain, Ohio	Massillon, Ohio	Middletown, Ohio	Milwaukee	Minnequa, Colo.	Newark, N. J.	New Haven, Conn.	Oil City, Pa.	Philadelphia	Piqua, Ohio	Pittsburgh	Portland, Ore.	Reading, Pa.
SEMIFINISHED carbon: Ingots—forging																	X		
Billets, blooms, slabs—rer																	X		
Billets—forging																	X	X	
Blooms—forging																	X	X	
Slabs—forging																	X		
Skelp																	X		
Tube rounds																	X		
Wire rods				X													X		
SHEETS carbon: H-r, 18-ga & heavier						X											X	X	
H-r annealed, 19-ga & lighter				X		X													
Cold-rolled									X								X		
Galvanized				X		X			X								X		
Enameling									X								X		
Long ternes																	X		
Electrical				X													X		
STRIP carbon: Hot-rolled						X											X	X	
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Seamless press. tubing																	X		
Mech. electricweld tubing														X		X	X		
ALLOY STEEL: Ingots																	X		
Billets, blooms, slabs								X									X		
Bar shapes																	X		

	Richmond, Va.	San Francisco	Seattle, Wash.	Shelby, Ohio	Sparrows Point	Syracuse, N. Y.	Tacoma, Wash.	Toledo	Titusville, Pa.	Trenton, N. J.	Warren, Ohio	Washington, Pa.	Watervliet, N. Y.	Waukegan, Ill.	W. Leechburg, Pa.	Williamsport, Pa.	Worcester	Youngstown	Add'l Pacific Coast*
SEMIFINISHED carbon: Ingots—forging																			
Billets, blooms, slabs—rer																			
Billets—forging			X				X												X
Blooms—forging			X				X												X
Slabs—forging																			
Skelp																		X	
Tube rounds																			
Wire rods		X															X		
SHEETS carbon: H-r, 18-ga & heavier		X	X		X		X											X	X
H-r annealed, 19-ga & lighter		X																X	
Cold-rolled																		X	
Galvanized		X			X													X	
Enameling																		X	
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Electrical																			
STRIP carbon: Hot-rolled		X	X				X											X	X
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Mech. electricweld tubing						X			X		X		X																				X		X	X						X				X			X											
ALLOY STEEL: Ingots								X																												X																								
Billets, blooms, slabs			X				X	X	X																		X									X																								
Bar shapes																	X																			X																				X				
Hot-rolled strip			X				X	X									X										X									X																				X				
Cold-rolled strip											X																																												X	X				
Hot-rolled bars			X				X	X	X								X								X		X									X				X																X				
Cold-finished bars							X	X	X		X																									X																				X				
Plates									X			X					X																			X																								
Standard structural shapes			X						X								X																			X																								
Seamless mech. tubing								X	X				X																X							X						X																		
Seamless press. tubing									X																											X																								
HI. STRENGTH LOW ALLOY Hot-rolled sheets				X			X		X		X						X																			X							X													X				
Cold-rolled sheets							X		X		X						X																			X																				X				
Galvanized sheets																																				X							X																	
Hot-rolled strip				X					X		X						X																			X																				X				
Cold-rolled strip									X		X																									X																				X				
Bars & small shapes				X			X		X								X																			X																				X				
Plates				X					X								X	X																		X							X													X				
Std. structural shapes			X	X			X		X								X																			X																				X				
Wide flange beams			X						X																											X																								
STAINLESS STEEL: Billets, forging		X	X		X			X	X						X	X																		X		X		X						X			X				X									
Sheets		X			X			X	X																			X								X																								
Hot-rolled strip								X	X																													X																		X				
Cold-rolled strip		X						X			X											X														X		X															X			X				
Hot-rolled bars		X	X		X			X	X						X	X																		X		X		X						X			X				X									
Cold-finished bars		X	X		X			X	X		X				X	X																		X		X		X						X							X									
Hot-rolled rod																																												X																
Plates		X			X			X				X																X								X																								

Product	Ashland, Ky.	Baltimore	Bethlehem	Birmingham	Brackenridge, Pa.	Brooklyn	Buffalo	Canton, Ohio	Chicago	Claymont, Del.	Cleveland	Coatesville, Pa.	Detroit	Duluth	Dunkirk, N. Y.	Ft. Wayne, Ind.	Gary	Geneva, Utah	Granite City, Ill.
Hot-rolled bars		X	X		X			X	X						X	X			
Cold-finished bars		X	X		X			X	X		X				X	X			
Hot-rolled rod																			
Plates		X			X			X				X							
Structural shapes					X				X										
Seamless tubing					X			X	X										
Cold-drawn wire		X			X			X			X				X	X			
Flat c-r wire		X						X			X				X				
Tool steel			X					X							X				
CLAD STEEL: Stainless—carbon sheets					X														
Stainless—carbon strip																			
Stainless—carbon plate												X							
Ni., Inconel, Monel—carb. plates												X							
WIRE & RELATED PRODUCTS Mfrs. bright, low carbon				X					X		X			X					
Spring, high carbon									X		X								
Nails & staples				X					X					X					
Merchant quality wire				X					X		X			X					
Barbed wire				X					X					X					
Woven fence				X					X										
Bale ties				X					X					X					
Fence posts									X		X			X					
Flat wire											X			X					
Wire strand											X			X					

Product	Houston	Huntington, W. Va.	Jersey City	Kokomo, Ind.	Lebanon, Pa.	Los Angeles	Lorain, Ohio	Mansfield, Ohio	Middletown, Ohio	Milwaukee	Minnequa, Colo.	Newark, N. J.	New Haven, Conn.	Oil City, Pa.	Philadelphia	Piqua, Ohio	Pittsburgh	Portland, Ore.	Reading, Pa.
Hot-rolled bars															X		X		X
Cold-finished bars															X		X		X
Hot-rolled rod																			
Plates									X								X		
Structural shapes																	X		
Seamless tubing										X							X		
Cold-drawn wire												X			X		X		X
Flat c-r wire																	X		X
Tool steel																	X		
CLAD STEEL: Stainless—carbon sheets																	X		
Stainless—carbon strip																			
Stainless—carbon plate																	X		
Ni., Inconel, Monel—carb. plates																			
WIRE & RELATED PRODUCTS Mfrs. bright, low carbon				X													X		
Spring, high carbon																	X		
Nails & staples				X													X		
Merchant quality wire				X													X		
Barbed wire				X													X		
Woven fence				X													X		
Bale ties																	X		
Fence posts																	X		
Flat wire																	X		
Wire strand													X				X		

Product	Richmond, Va.	San Francisco	Seattle, Wash.	Shelby, Ohio	Sparrows Point	Syracuse, N. Y.	Tacoma, Wash.	Toledo	Titusville, Pa.	Trenton, N. J.	Warren, Ohio	Washington, Pa.	Watervliet, N. Y.	Waukegan, Ill.	W. Leechburg, Pa.	Williamsport, Pa.	Worcester	Youngstown	Add'l Pacific Coast*
Hot-rolled bars						X			X				X						
Cold-finished bars						X							X						
Hot-rolled rod						X													
Plates																			
Structural shapes																			
Seamless tubing																			
Cold-drawn wire						X							X						
Flat c-r wire															X				
Tool steel						X													
CLAD STEEL: Stainless—carbon sheets												X							
Stainless—carbon strip															X				
Stainless—carbon plate																			
Ni., Inconel, Monel—carb. plates																			
WIRE & RELATED PRODUCTS Mfrs. bright, low carbon		X															X		
Spring, high carbon										X							X		
Nails & staples		X															X		
Merchant quality wire		X															X		
Barbed wire		X																	
Woven fence		X																	
Bale ties		X																	
Fence posts																			
Flat wire																	X		
Wire strand		X			X					X				X					

This chart by no means includes all steel products. On the contrary, many specialized products and those sold to a very few customers have not been included. Additional space is provided for new points and other products.

* *Additional Pacific Coast basing points: San Diego, San Pedro, Wilmington, Long Beach, Oakland, Alameda, Berkeley, Richmond, Stockton and Sacramento, all in California.*

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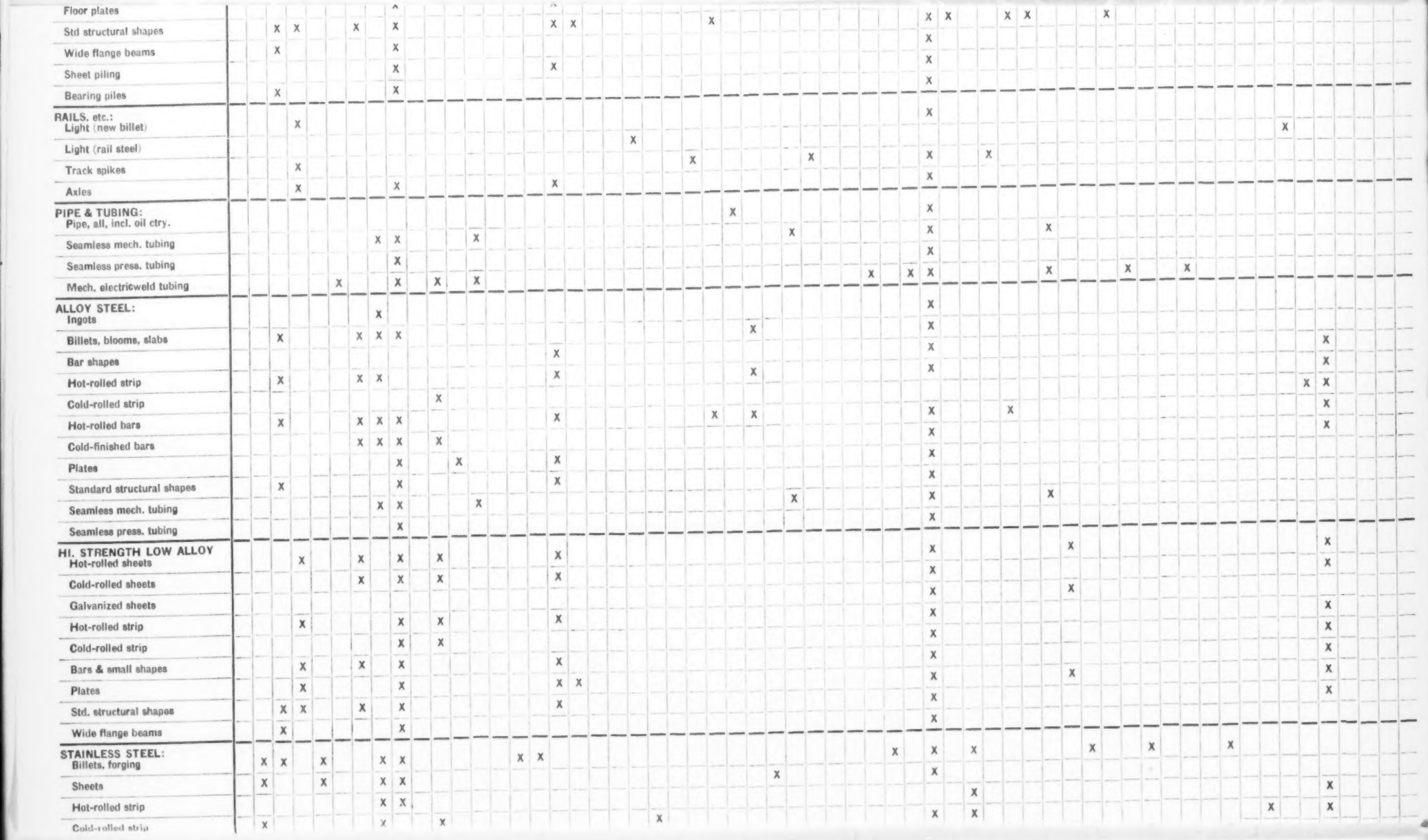
Floor plates
Std structural shapes
Wide flange beams
Sheet piling
Bearing piles
RAILS, etc.:
Light (new billet)
Light (rail steel)
Track spikes
Axles
PIPE & TUBING:
Pipe, all, incl. oil ctry.
Seamless mech. tubing
Seamless press. tubing
Mech. electricweld tubing
ALLOY STEEL:
Ingots
Billets, blooms, slabs
Bar shapes
Hot-rolled strip
Cold-rolled strip
Hot-rolled bars
Cold-finished bars
Plates
Standard structural shapes
Seamless mech. tubing
Seamless press. tubing
HI. STRENGTH LOW ALLOY
Hot-rolled sheets
Cold-rolled sheets
Galvanized sheets
Hot-rolled strip
Cold-rolled strip
Bars & small shapes
Plates
Std. structural shapes
Wide flange beams
STAINLESS STEEL:
Billets, forging
Sheets
Hot-rolled strip
Cold-rolled strip

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Over the years, plant locations, sales policies and future plans have been made by steel users with the multiple basing point system of steel marketing in mind. To replace it with the untried f.o.b. mill system advocated by a majority of the members of the Federal Trade Commission would gain nothing. At least this is the opinion of steel executives and of many steel users and industry observers.

Often overlooked by critics is the fact that the present system evolved over a period of years, in good times and bad, and for a while at least had the blessing of the government. The swing away from the Pittsburgh plus method of steel pricing began early in the 1920s when Chicago and other new steel centers found themselves with more capacity than they could sell in their own districts. In 1924 the FTC ordered the U. S. Steel subsidiaries to "cease and desist" from selling at prices based on any point other than that of actual production or shipment. After this the number of basing points used by the industry began to increase. The NRA Steel Code recognized and continued the multiple basing point method of marketing steel. President Roosevelt, however, ordered a report on the practice from both FTC and NRA. The former found against it, the latter concluded that it was a competitive method of selling properly suited to the requirements of the industry.

Since then, changes in the system in normal times have come about as a result of competitive conditions and consumer demand, suggestion or pressure. There never was a time in recent normal years when the steel industry had any control over the actions of its customers. The latter retained as a potent weapon the right to change sources of supply. In recent months a fair percentage of customers have indicated they were thinking about just this. They will have to wait a little while though, until they are again behind the wheel.

The current action of the FTC against the steel industry was filed Aug. 17, 1947, and subsequently amended so that it now includes the American Iron & Steel Institute and 101 steel producers. The FTC's Pittsburgh plus case against the U. S. Steel began in 1921; the cement industry basing point case was started in 1937. So, according to Lowell B. Mason, a member of the FTC, it might be 1957 before the current case against the steel industry is settled. Mr. Mason has said that "Because the administered price lacks the St. Vitus Dance quality of an Adam Smith price, it is often associated with the frozen prices of a conspiracy, and many bureaucrats in Washington believe that for this reason administered prices should be done away with."

The FTC action, laying heavy emphasis on today's steel marketing conditions, assumes that the current tight steel supply situation will last forever. It won't. It never has and there is no reason to believe it will. For that reason all steel companies that plan to stay in business are bending over backwards to build good customer relationships. They know full well that when business starts slipping the customer will again tell which company what to ship where and how much freight to absorb. Any belief that steel company withdrawals from high-cost territories is a permanent decision is silly on the face of it.

Meanwhile the multiple basing point system governs steel marketing and will for some time unless the pending case moves like a rocket. The insert in this issue lists the basing points of major steel products at this time. Every effort has been made to include all announced basing points for these products, but THE IRON AGE cannot assume responsibility for its complete accuracy. One reason is that naming of new basing points and withdrawing of others is a continuing process. In addition, some of the smaller producers questioned on this matter hesitated to commit themselves one way or another. Others declined to even answer letters on the subject.

On Basing Points

A decision rendered Sept. 20, 1946, by the U. S. Circuit Court of Appeals at Chicago set aside an FTC order issued against the multiple basing point system of marketing in the cement industry. The case has not yet been brought before the U. S. Supreme Court (THE IRON AGE, Oct. 3, 1946, p. 85).

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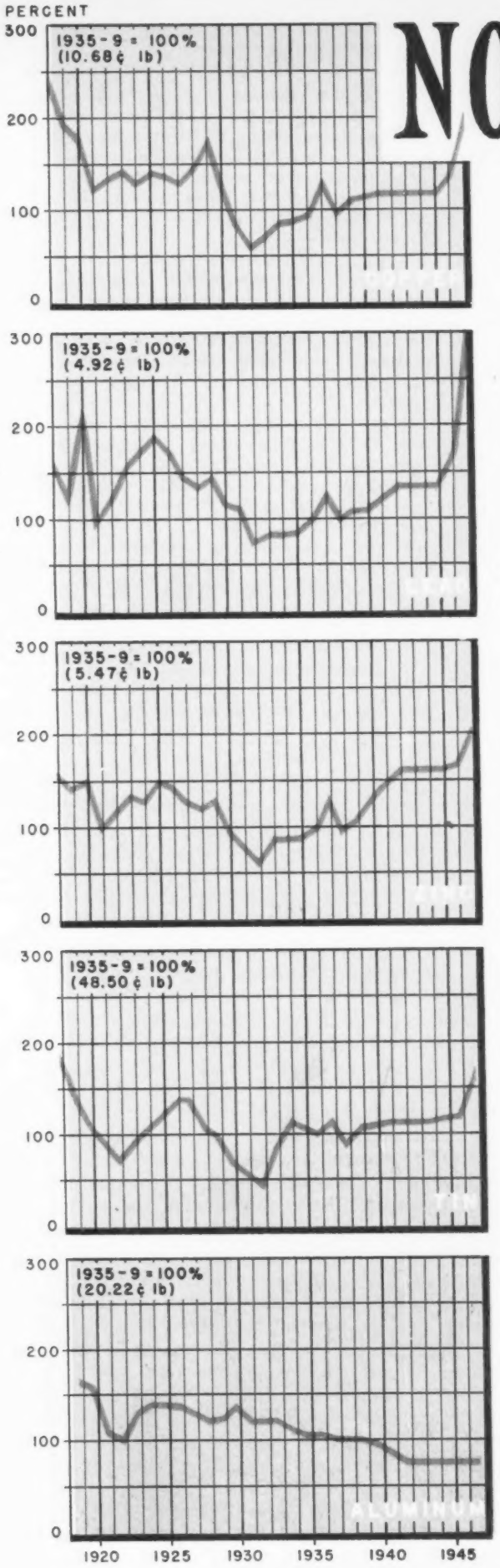
NONFERROUS



PRICES of all the nonferrous metals were firm at the end of 1947. This is significant because the present prices of copper, zinc, tin and antimony have only been exceeded by wartime peaks of 30 years ago. Since the turn of the century, the only other period of higher prices was in the prosperous era preceding the panic of 1907 when peak prices of copper, tin and antimony exceeded those current. Lead is now priced at an all-time high.

Yet there are pressures at work today, in addition to the general inflationary trend, that can support a prediction of higher prices during 1948 for some, perhaps all, of the metals mentioned, unless there is a general economic collapse before time permits their effects to be felt.

Against this background, prices of aluminum ingots and finished products have been constantly decreased since the discovery of the metal. Aluminum prices have remained practically unchanged during the postwar period of wage increases and other inflationary pressures.

Relative shortages of sheet and strip, extrusion and rod mill capacities, combined with a long-term shortage of water power, have so far prevented aluminum from capturing an even larger proportion of the markets normally served by other metals. Moreover, the huge accumulations of warplane scrap and contract termination aluminum inventories have been absorbed into mill production and ingot producers schedules with practically no evidence of the predicted market glut. It is expected that this source of raw material for specialized low cost aluminum products will come to an end in 1948 when the wrecked and obsolete warplane scrapping program comes to an end.

When new aluminum finishing facilities get into operation early next year, if coupled with a more normal rainfall in the United States and Canada, wider entry of aluminum products into competitive metal fields is assured. This prediction is based on the market outlook for the major nonferrous metals and steel products during 1948, as indicated by 1947 experience.

Domestic demand for lead, copper, tin, aluminum and steel products was overwhelming during most of 1947, and there is nothing on the horizon to indicate the prospect of any change in 1948. During late spring and summer last

PRICES of major nonferrous metals, with the exception of aluminum, showed sharp rises over the past year, and in the case of lead rose above the World War I postwar period. The curves on the charts to the left are expressed as a percent of base years.

Tight supplies and higher costs forecast for '48.

By JOHN ANTHONY
Eastern Regional Editor,
THE IRON AGE

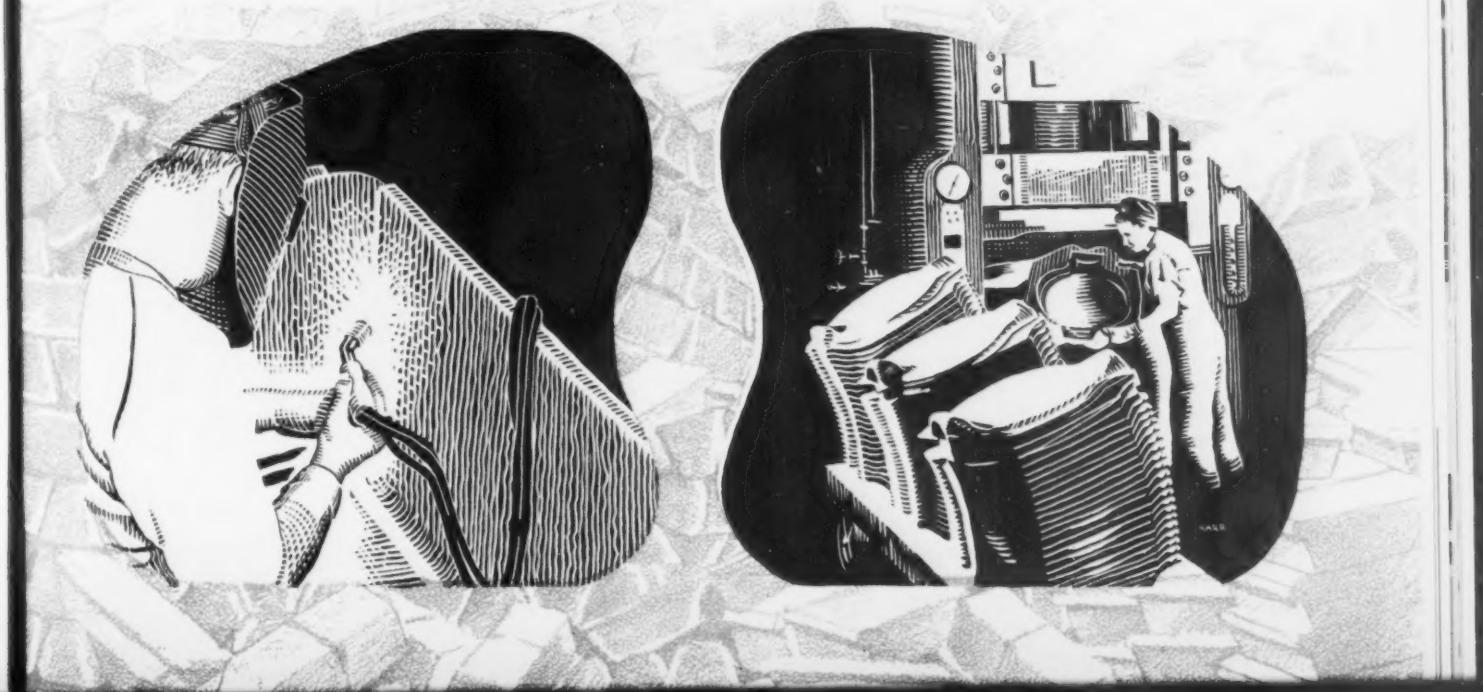
● ***Pressed by heavy domestic demands and the bullish influences of foreign aid needs and United States stockpiling activities, the prospects for the major nonferrous metals in 1948 are higher prices and continued tight supplies, notwithstanding the likelihood of some expansion in mine output here and abroad. Aluminum, meanwhile, is still a dark horse with its present competitive position yet to be tested and with substantial new finishing capacity scheduled to come into production soon.***

year, domestic demand for nonferrous metals faltered badly and foreign demand dried up due to the worldwide shortage of dollar credits. It was a period in which the whole economy displayed a deep-seated lack of confidence. Cancellation or deferment of orders and the reduction of consumer inventories were universal.

During this period the metal industry felt the decline in confidence acutely because of the high level of nonferrous metals prices in effect during the first quarter, and more particularly because consumers believed that such prices could not be sustained. However, it is significant that there were no price declines in any metal except copper, in which there had been a price spread of 2½¢ for several weeks when several producers advanced their price to 24¢.

The zinc market would probably have declined during the summer but for the fact that there were Treasury purchases for the Army and Navy Munitions Board strategic stockpile. This boldly conceived program for accumulating strategic materials has so far been largely ineffectual as far as metals and minerals are concerned. Active industry demands for the metals have prevented the purchase of any tonnages of copper or lead, and only 130,000 tons of zinc by the end of November. But as long as the program is in being it will exert a strengthening effect on the metal markets out of all proportion to the tonnages involved. Some consideration is already being given to a possible acceleration of the stockpiling program in view of the unsettled international situation.

At the end of the summer, domestic demand for copper, lead, tin, aluminum, and zinc in some grades, bounced up to first quarter peak levels. Foreign demands have improved some but are



still depressed by lack of dollars. This is just as well for domestic industry, because there is need for all the domestic and foreign metals and minerals available at this time to avert greater shortages than those prevailing now.

Dollar shortages abroad are about to be relieved to some extent, and this can only lead to greater price competition for world minerals. Unless domestic metal consumers are subsidized again by government purchases abroad at world prices and sale at home at controlled lower prices, probably coupled with allocations, domestic prices must rise with world prices. Export controls alone will not be adequate as some of all metals in short supply must come from abroad.

Move to Increase Dollar Credits

There are two movements of dollar credits abroad which are about to supplement the dollar granting effect of loans such as the interim European aid program, the unfreezing of the $400 million British loan balance, and action taken by such agencies as the Export-Import Bank and the World Bank. One is the investment of United States capital in factories located in countries which have cut back imports from dollar countries. This movement is already under way. The other is a campaign sponsored by the State and Commerce Depts. to educate Americans to buy more foreign-made goods and to work with Europeans, Asiatics and Latins on lists of goods that can be sold here. There is also a move afoot in this country to encourage foreign nations to devalue their currencies to realistic valuations so that dollar countries will find it profitable to buy abroad in volume sufficiently great as to tend to balance international trade.

Production costs of metal producers have increased tremendously since the end of the war. Wage rates, freight rates and other costs have risen to the point where it has been estimated that 15¢ copper today would be the equivalent of 8¢ prewar copper. The spring will probably bring another round of wage demands on producers, smelters, refiners, mills and fabricators unless Congress should agree to stabilize wages and prices, and perhaps reinstitute priorities or allocations. An application for higher freight rates, an important factor in metal production costs, is still pending before the ICC.

A comprehensive review of the fast growing aluminum industry on the West Coast is given in the article, "The New Giant of the West," on p. 190.—Ed.

Metal producers are unhappy about present high prices of metals. Many of their customers do not understand that domestic prices for metals in which we are not fully self-sufficient are tied to world prices which suffer from varying pressures of supply and demand.

Most important of all, however, they are losing some portions of markets that have taken years to develop. Once established in a market, competitive metals are hard to displace. It is undeniable that for certain applications competitive metals may afford certain intrinsic advantages and might eventually have taken a place in the market. But important price advantage counts at once and hastens the orderly market readjustments which are always under way. There is also the important and natural human reluctance to change techniques and tooling once they are established.

Copper producers, with their wire and brass mill subsidiaries, have been hit hardest by the post-war market reorientation. Recently copper wire mills readjusted downward their prices on copper wire without any corresponding decline having occurred in the virgin copper market. This is a new departure in the wire trade which observers attribute to an attempt to divert a portion of current high profits to meeting aluminum wire competition on a price basis.

A number of independent wire producers have already converted a portion of their production from copper to aluminum. Other manufacturers have developed lines of solderless wire and cable connectors for aluminum wire, and techniques for soldering and other methods of joining. Roughly 25 pct of domestic copper consumption in the past went into wire conductors. A part of this copper tonnage goes into fine wire production such as motor windings, in which aluminum wire has no place.

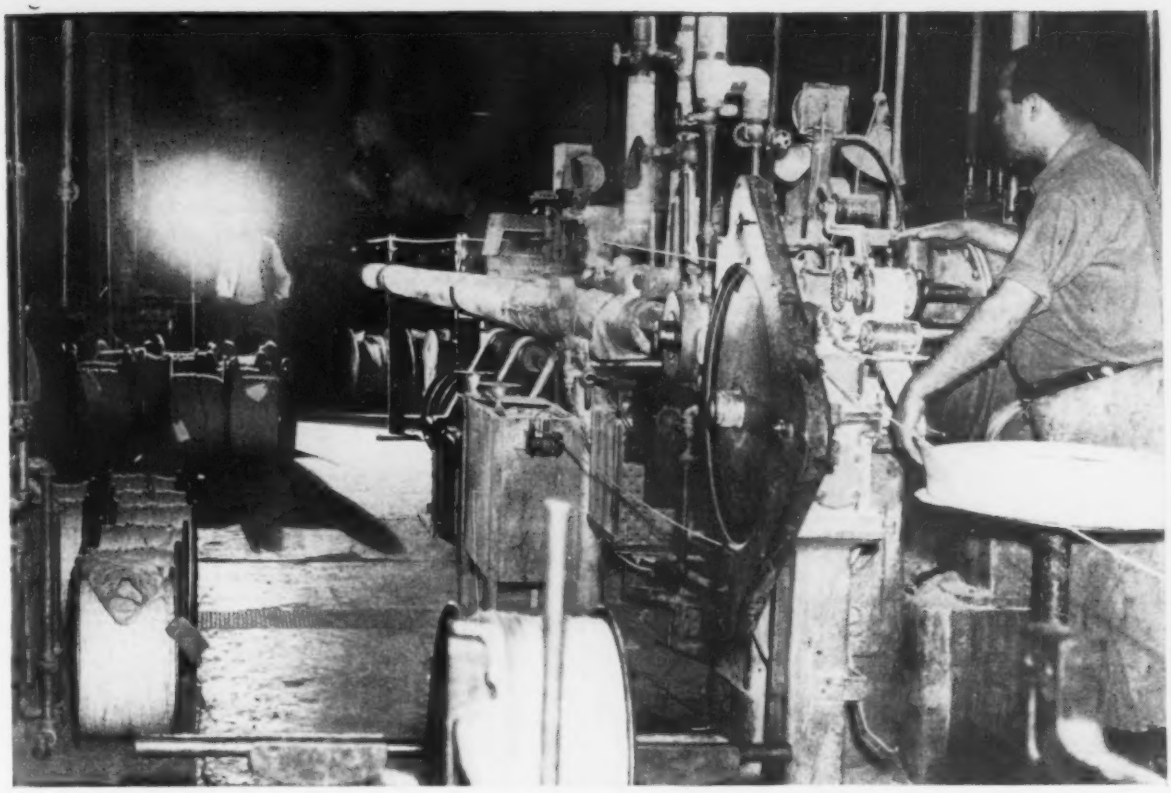
Aluminum Wire Output Increases

One wire mill has estimated that 50 pct of its current wire production is in aluminum. Tonnagewise, copper wire production by this mill is much greater. Wire producers are in the aluminum field to stay. They estimate that aluminum offers a price advantage in sizes down to No. 12 AWG even if copper were to drop below 15¢ per lb. The cost of insulation goes up disproportionately in the finer gages, but for aircraft wire, aluminum is drawn down as fine as No. 14 AWG. Comparative selling prices per 1000 ft for several gages of insulated wire are as follows:

Conductor Size	Aluminum	Copper
1/0 AWG	$143.00	$196.60
2/0 AWG	$170.00	$237.00
3/0 AWG	$197.00	$283.40
500,000 cm	$472.00	$750.80

Quotations are for aluminum wire in Paracore type RH insulation and copper in type R insulation which permits equal current carrying capacity gage for gage. In long circuits or in installations where voltage drop need be considered two gages heavier aluminum wire is recommended to compensate for the fact that aluminum has only 84 pct of the current carrying capacity of copper.

It is significant that the brass mill industry is the one metal finishing industry that by the end of the year had not recovered to peak order volume, within the limits of available raw materials. At current high brass product prices, fabricating subsidiaries of some mills report that the growth in demand for their aluminum fabricated products has upset the prewar relationship



PRODUCERS of aluminum building wire estimate the product can compete with copper priced below 15¢ per lb. in sizes down to No. 12 AWG. One producer estimates that 50 pct of his wire production is now in aluminum. Shown above is an operation at United States Rubber Co.'s plant at Bristol, R. I., where insulation is extruded on aluminum wire and vulcanized.

among products. Whether this modified market relationship will continue after the price of copper drops to more normal levels remains to be seen.

It is conceivable that competition among aluminum producers may bring down the price of aluminum finished products enough to permit the present relationship to continue. During the summer, two aluminum producers dropped their prices for sheet product specialties in order to get more business. Market observers have been inclined to feel that the decreases would have been met by the third producer except that it might have been suspect by government of attempting to monopolize the market.

Competition between brass mill products and other metals is apparent in many directions. Even a high cost metal like stainless steel must be given consideration by brass mill executives these days. The lowly kitchen sink strainer with stainless steel flange and basket strainer is widely marketed at competitive prices by mail order houses and plumbing suppliers.

In the current steel shortage, aluminum sheet and strip have replaced steel products for many applications. One producer has reported that its farm roofing now covers more than 500,000 farm buildings. Opinions vary as to the relative cost advantages of aluminum against current prices for steel. All are agreed that aluminum can compete advantageously with current steel gray market prices. Most manufacturers, including the auto industry, are giving serious consideration to the possibility of utilizing aluminum to stretch their steel supplies. How much of the substitution of aluminum for steel will stick when a normal buyer's market returns is still in the range of speculation. One thing is certain: In the present tight market for flat-rolled products, aluminum producers are unwilling to take orders for applications which they know will revert to another metal when competitive conditions change.

The Marshall Plan, if accepted by Congress will add pressure to the domestic shortages of nonferrous metals whether by shipments of metals to foreign consumers from domestic or foreign origin, or whether it should involve merely the shipment of machinery and equipment in which nonferrous metals are used. However, a bill has been introduced into the House by the House Select Committee on Foreign Aid under the chairmanship of Representative Christian A. Herter, which would incorporate in the Marshall Plan a proposal to encourage increased production of strategic metals and minerals in colonial possessions of European nations receiving our aid.

The bill provides that these strategic materials would be deposited in the United States permanent stockpile in partial compensation for our contributions to European aid. A similar proposal was made recently by Commerce Secretary Harriman, chairman of the Mineral Resources Subcommittee of the President's Committee on Foreign Aid.

The Herter bill, HR 4579, proposes the direct acquisition of mineral rights in colonial countries by our government, or government encouragement of private United States capital to develop foreign deposits with guarantees of delivery to the strategic stockpile. The Herter Committee estimates that foreign minerals estimated at conservative metal prices at $136 million per year, see Table I, could be obtained for the stockpile, in addition to the normal commercial mineral exports of some $250 to $300 million.

TABLE I

Minerals To Be Made Available To United States

Recommendations of Herter Committee on European exports to compensate U. S. for aid under the Marshall Plan

	Country	Tonnage	Assumed Price Landed in United States	Value Landed in United States
British Empire				
			Per Unit	
Copper	Rhodesia	25,000	$300	$7,500,000
Lead	Tanganyika	10,000	200	2,000,000
Tin	Malaya	20,000	1,100	22,000,000
Bauxite	Gold Coast	50,000	12	600,000
	British Guiana	150,000	12	1,800,000
Manganese	Gold Coast	100,000	35	3,500,000
Chromite	Rhodesia	50,000	35	1,750,000
	Sierra Leone	20,000	35	700,000
Vanadium (as V_2O_5)	Rhodesia	200	2,000	400,000
Asbestos	Rhodesia	5,000	75	375,000
Diamonds	West Africa	[1]500,000	3	1,500,000
Mica	Tanganyika and Rhodesia	200	3,000	600,000
Graphite	Ceylon	1,500	90	135,000
Total annual value				42,860,000

[1]Carats.

British Dominions

			Per Unit	
Copper	Canada	20,000	$300	$6,000,000
Lead	Australia	15,000	200	3,000,000
	Burma	15,000	200	3,000,000
	South Africa	15,000	200	3,000,000
Zinc concentrate	Australia	30,000	40	1,200,000
	Canada	25,000	40	1,000,000
	South Africa	30,000	40	1,200,000
Manganese	India	100,000	35	3,500,000
	South Africa	50,000	35	1,750,000
Chromite	South Africa	50,000	30	1,500,000
Nickel	Canada	10,000	650	6,500,000
Tungsten	South Africa	200	1,200	240,000
	Burma	1,000	1,200	1,200,000
Platinum metals	South Africa	[1]10,000	50	500,000
Mica	India	2,000	1,500	3,000,000
Asbestos	South Africa	10,000	100	1,000,000
Total annual value				37,590,000

[1]Ounces.

French, Belgian, Dutch Empires

			Per unit	
Copper	Belgian Congo	20,000	$300.00	$6,000,000
Tin	East Indies	20,000	1,100.00	22,000,000
	Belgian Congo	2,500	1,100.00	2,750,000
Lead	Morocco	20,000	200.00	4,000,000
Zinc	Belgian Congo	20,000	160.00	3,200,000
Zinc concentrate	Morocco	30,000	40.00	1,200,000
Bauxite	France	50,000	12.00	600,000
	East Indies	100,000	12.00	1,200,000
	Surinam	100,000	12.00	1,200,000
Chromite	New Caledonia	15,000	35.00	525,000
Cobalt	Belgian Congo	1,000	3,000.00	3,000,000
Cobalt ore	Morocco	2,000	300.00	600,000
Nickel	East Indies	5,000	650.00	3,250,000
Mica	Madagascar	300	2,000.00	600,000
Graphite	Madagascar	2,000	100.00	200,000
Diamonds	Belgian Congo	[1]500,000	.50	250,000
Tantalum-columbium ore	Belgian Congo	500	600.00	300,000
Total				56,875,000

[1]Carats.

Others

			Per unit	
Tungsten	Portugal	1,000	$1,200	$1,200,000
Mercury	Italy	[1]4,000	60	240,000
Talc (steatite)	Italy	1,000	40	40,000
Chromite	Turkey	50,000	35	1,750,000
Copper	Turkey	5,000	300	1,500,000
Cryolite	Greenland	2,000	90	180,000
Total value				4,910,000

[1]Flasks.

As drawn, the bill would set up an agency to be known as the Foreign Aid Council, to include the Secretary of State, as chairman, and the Secretaries of National Defense, Commerce, Agriculture and Treasury. It would also include the directors of the Emergency Foreign Reconstruction Authority and chairman of the board of the Export-Import Bank. The materials shown in Table I are those that the Herter Committee expects would be made available annually for stockpiling over a 10- to 20-year period. Delivered prices of the minerals shown have been estimated conservatively in an effort to approximate 20-year average prices. Copper is set at 15¢, lead 10¢, zinc 8¢, tin 49.5¢. It is reasonable to assume that, if passed, the Marshall Plan will incorporate some such provision.

The Herter Committee report contains estimates of nonferrous metals required by European nations under the Marshall Plan from 1948 through 1951. These estimates were worked out by a committee of European experts who came to this country to discuss their needs here. In 1948, the United States will be called on to supply $50 million worth of copper (116,000 tons at 21.50¢), $1 million of lead (3500 tons at 14.25¢), $25 million of zinc (119,000 tons at 10.50¢). The other American nations are expected to supply in 1948 $145 million of copper (337,000 tons), $45 million of lead (158,000

tons), $60 million of zinc (285,000 tons). From 1949 through 1951, copper requirements are estimated at $550 million from the American continent, none from the United States. This is an average of 349,000 tons a year. Lead requirements for the same period are $350 million, or 409,000 tons a year. Zinc requirements would be $280 million, or 440,000 tons a year.

It may be predicted that some form of subsidy program will be enacted by Congress and passed by the President during 1948 to encourage marginal mines to continue in operation and to foster exploration and development work. The subsidy program will not necessarily be based on premium payments on above-quota mine, mill or smelter production. For some time mining men have been analyzing various proposals, and studies have been going on in several government branches. At year end, Interior Secretary Krug had constituted a Minerals Advisory Council which is expected to develop the background information needed to advise the President and Congress in the further development of a sound national mineral program.

Subsidy Program Forecast

A study of the remarks of Secretary Krug and Bureau of Mines director James Boyd at the recent El Paso, Texas, meeting of the Western Div., American Mining Congress indicates the more probable forms such a subsidy program might take. It could be a subsidy granted in inverse proportion to the size of the operation, on the theory that it is in the national interest to sustain small, currently uneconomic mines, some of which may turn out to be the large producers of the future.

It could be the purchase of strategic minerals for the stockpile direct from the marginal producers at prices higher than even the current market prices, and on a sufficiently long-term basis to enable the operators to recover their investment.

It could be special tax treatment to encourage exploration and development, coupled with the modification of regulations on the issuance of securities by mining companies. The question is merely "What form of subsidy—direct payments, tariff protection, tax benefits or other support—is best for the industry and reconcilable with the national interest," in the words of Director Boyd.

The President vetoed the extension bill for premium payments on copper, lead and zinc during the year largely because it was so phrased as to stimulate mostly the production of zinc which is in the greatest supply of any of the strategic metals, and because it was inequitable among producers who were intended to benefit by it, and because it failed to provide for administrative flexibility and the funds sufficient to carry out its objectives.

At the year end, tariff concessions worked out at the Geneva Conference of 23 nations were announced to go into effect Jan. 1 to run for a period of 3 years. The other nations whose concessions also go into effect on that date include the United Kingdom, Canada, Australia, France, Belgium, the Netherlands and Luxemburg. Other nations will make their concessions effective by June 30, 1948.

Tariff action on major nonferrous metals was not significant at this time. Lead was not included in the concessions. The duty on copper ore, concentrates, blister, refined metal and scrap was reduced by 50 pct to 2¢ per lb of contained metal. The 50 pct reduction also applies to copper and brass fabricated products. Congressional action early in the year suspended the 4¢ copper tariff until March 31, 1949. Tariff reductions were made on slab zinc, ores and concentrates to the levels now current under the Mexican agreement of 1942. These rates were to be increased to the prewar levels at the expiration of the emergency.

One of the most significant changes was in nickel and nickel alloys, a reduction of 50 pct to 1¼¢ per lb. The action brought an announcement by International Nickel Co. that the reduction would result in an equivalent price reduction to United States consumers. Aluminum in crude forms was reduced from 3¢ to 2¢ per lb. Bauxite was reduced from $1.00 to 50¢ a ton. Antimony metal and oxide, from 2¢ to 1¢ per lb.

The working of low-grade domestic ore bodies is about to begin on a large scale. A new copper ore body, which is expected to be second only to Kennecott's Utah Mine, is about to be developed by the Magma Copper Co. Deposits average 0.8 pct copper content and reserves are indicated of some 425 million tons. The San Manuel mine is located on a 3500-ft plateau near Tucson, Ariz. Full mine development will take 5 to 6 years at an estimated cost of $30 to $35 million. With a mine production of an estimated 25,000 tons of ore daily, yearly copper production would reach 60,000 to 65,000 tons.

Develop Low Grade Ores

Anaconda Copper Co. has announced plans to spend some $20 million in developing a large body of low-grade ore at Butte, Mont., over the next 5 years. Plans call for mining and milling 15,000 tons of ore a day to recover 20 lb of copper per ton. It is estimated that there is more than 130 million tons of ore available above the 3400 ft level. The ore contains precious metals.

The Bunker Hill & Sullivan Mining & Concentrating Co. at Kellogg, Idaho is preparing to mine and mill a large tonnage of low-grade ore left in the vicinity of the old stopes in the Coeur d'Alene mining region. It is estimated that there are some 5 million tons averaging 3 pct combined lead and zinc, plus ½ oz silver per ton.

There were no long-term strikes at domestic mines, smelters or refineries during the year. A strike of railroad workers at Kennecott Copper Co.'s Utah mine in the last quarter closed down production for nearly 3 weeks in which an estimated 15,000 to 16,000 tons of copper were lost. Copper mine production during the year was 875,000 tons, as compared with 608,737 tons in 1946. Refinery production was 1,185,000 tons, compared with 604,000 tons in 1946. Shipments of copper to consumers reached 1,375,000 tons in 1947, compared with 1,261,000 tons the previous year.

The Krug report on national resources and

foreign aid indicates that the European relief program is not expected greatly to affect domestic consumption even though current domestic demand constitutes a considerable drain on known United States reserves.

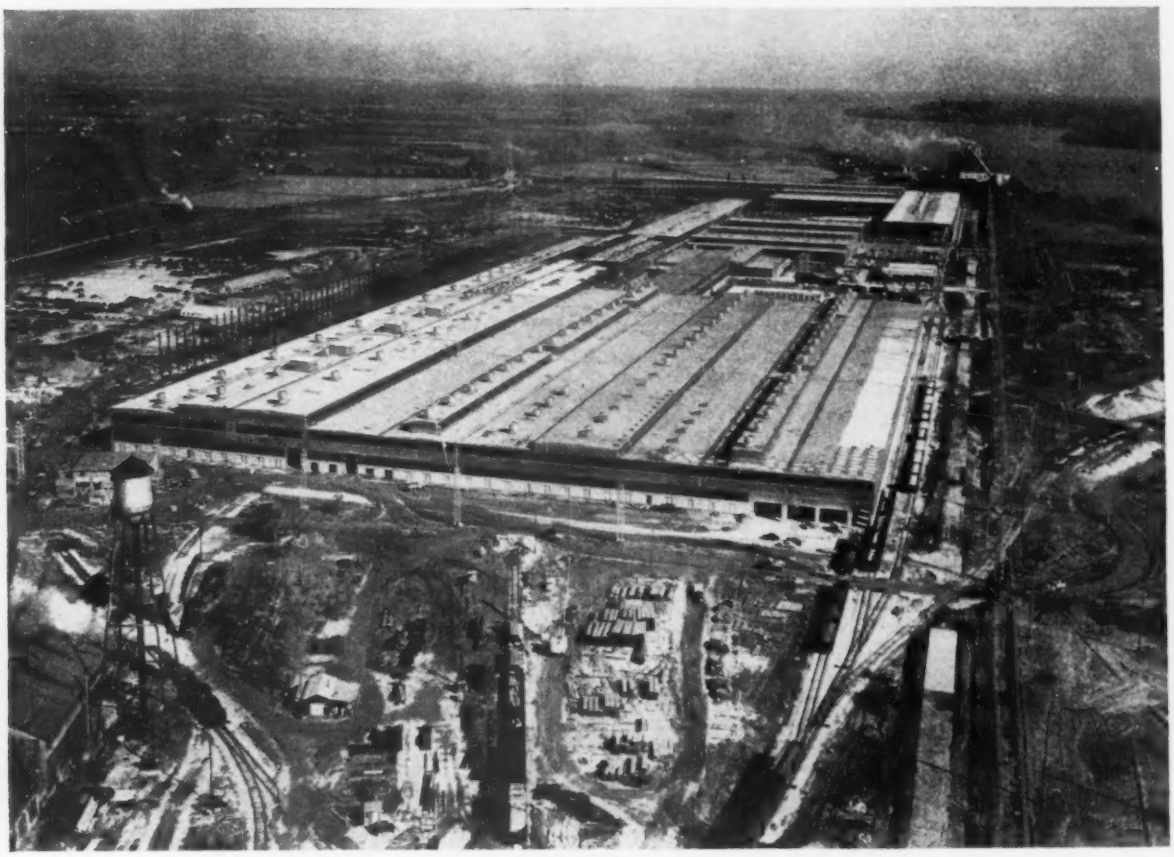
According to the report, "Output of copper from U. S. mines in 1947 to 1952 at current or somewhat lower prices is expected roughly to fall short of the expected needs of the domestic industry in that period by about 1 million short tons. Domestic mine production is estimated to be 900,000 short tons in 1947 and then to decline to an average of 825,000 tons per year from 1950 to 1952. Consumption for the same period will probably approximate 1,250,000 and 950,000 tons respectively. Production from foreign mines in 1946 was at little more than two thirds of their aggregate capacity as measured by recent peak outputs. Thus a substantial copper source for meeting world needs lay unutilized and continues to do so, although the problems involved in expanding production at many mines are not serious.

"Resumption of and maintenance of capacity production levels at home and abroad, for 2 or 3 years, would change the present world deficit to a surplus," according to the report.

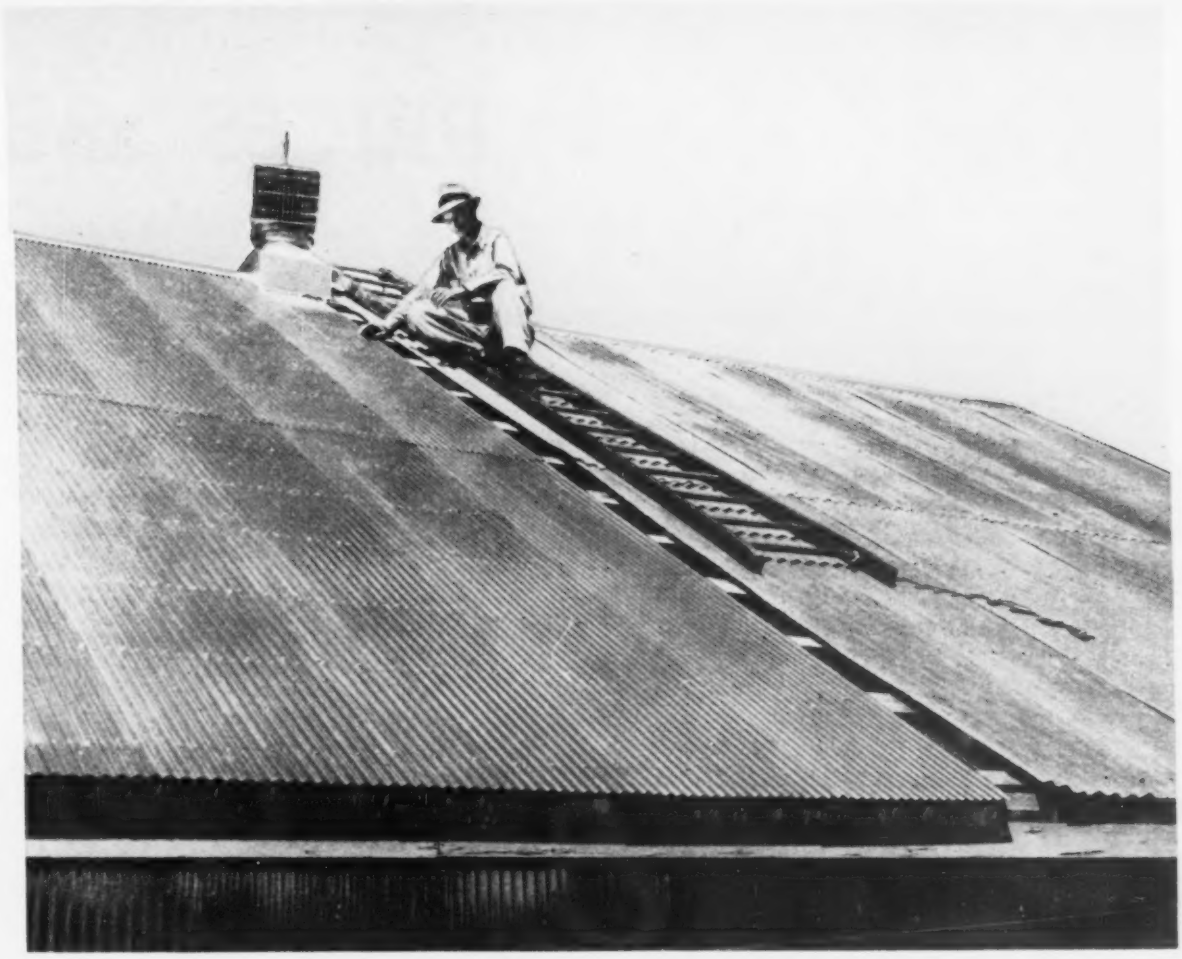
During the year, the Chilean government took action to increase by 20 pct the extraordinary tax on North American copper companies operating in Chile. During 1948 the tax will be at the rate of 60 pct of the difference in price between 10¢ per lb and the actual sales price of copper. Under such a tax method, it is obvious that the government would exert pressure to insure sale of Chilean copper at the world price, should the price of copper in the United States be held below the world market.

The Federal Trade Commission issued a report early in 1947 on a study of the copper industry with respect to the dominant position in copper mining, smelting and refining held by Anaconda Copper Co., Kennecott Copper Corp. and Phelps-Dodge Corp. According to the report "each of these three organizations has gone so extensively into the production of commodities of which copper or brass is an important raw material that normally its own fabricating plants use an amount of copper equal to the output of refined copper from its mining, smelting and refining operations; and in periods of brisk demand these fabricating plants are in the market for copper from other sources. The situation as to the sources of supply of raw material and as to the cost thereof laid down at the fabricating plant is such as to place the independent manufacturer of copper and brass products, whether he be a small or large operator, at a distinct disadvantage in competition with fabricating businesses of the 'Big Three' of the domestic copper industry."

In the Krug report on lead, at year end the metal in most critical short supply, it is said that "a substantial increase in world output in the near future is unlikely because developed reserves are seriously decreasing and current production rates are near capacity levels. Consequently it is clear that consumption will be curtailed, either by economic forces or by domestic or international governmental controls. Any re-



AERIAL view of Alcoa's Davenport Works taken in November. Officials expect the plant to be in production by March. The plant will roll 120 million lb of sheet a year; sheet will be rolled up to 120-in. wide.



THE aluminum roofing sheet market is founded on the use of large tonnages of low-priced scrap. Wartime scrap is drying up and the price is rising, yet producers feel they can continue to compete with galvanized sheet on a price basis when steel becomes available.

habilitation program placing heavy drains on lead supplies would reduce further the ability of American industry to meet domestic consumer and present export demand for end products. . . . Domestic smelter and refinery capacity for lead is far in excess of any probable requirements. Likewise the United States capacity is more than adequate for making lead sheets, bars, tubes and other primary shapes and for making lead alloy and pigments."

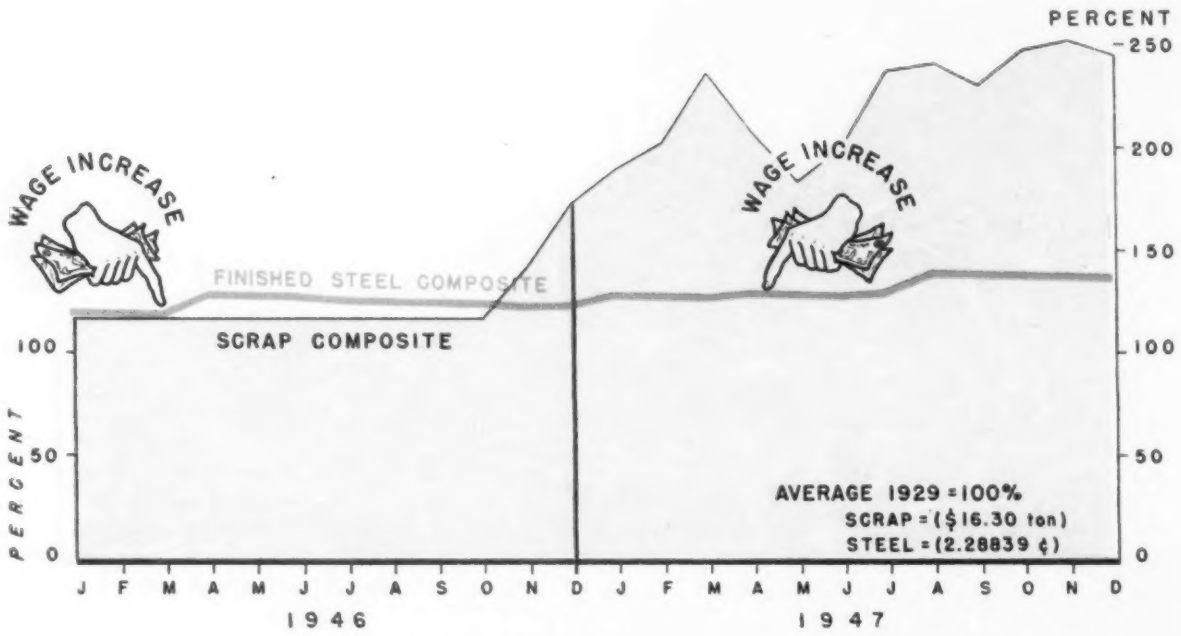
The report says "United States production plus secondary recovery from 1947 to 1952 cannot be expected at best to exceed an average of 800,000 to 850,000 short tons annually. Against this supply, domestic demand in an unrestricted full employment economy will average at least 1,200,000 tons. Currently the deficit between production and consumption is being met from stocks and imports. When stocks reach their irreducible minimum (before the end of 1947), the situation will be critical because foreign supplies, in the face of heavy increasing demands from other parts of the world, will not be adequate to meet the entire shortage."

Labor shortages handicapped western lead mines throughout the year. Yet domestic mine production reached 365,000 tons. Shipments of refined lead from primary and secondary sources during 1947 totaled 600,000 tons.

The Krug report states in respect to zinc that "From 1947 to 1952, United States needs are expected to remain at about 880,000 tons per year to be met by a slowly declining production from domestic mines and increasing imports. There is a war-accumulated stockpile of foreign concentrates in the United States containing some 300,000 tons of recoverable zinc. . . Any foreseeable added demand on the United States zinc supply for foreign rehabilitation not only would be small compared to the full demand but most likely would be supplied by imported metal. There is excess capacity for slab zinc production in the United States. Moreover the reviving zinc smelting industry of the Low Countries and northern France guarantees that the world's concentrates can be reduced to metal promptly."

Slab zinc production from concentrates reached 845,000 tons in 1947, well above that of any prewar year. Consumption also rose, and domestic shipments were reported of 710,000 tons, export and drawback shipments of 117,000 tons, and 130,759 tons reported earmarked for government account. Throughout the year there were critical or relative shortages of the grades of zinc used for galvanizing and for diecasting. Consumption of zinc for diecasting has gained ground much more rapidly than consumption for other purposes.

PRICES and



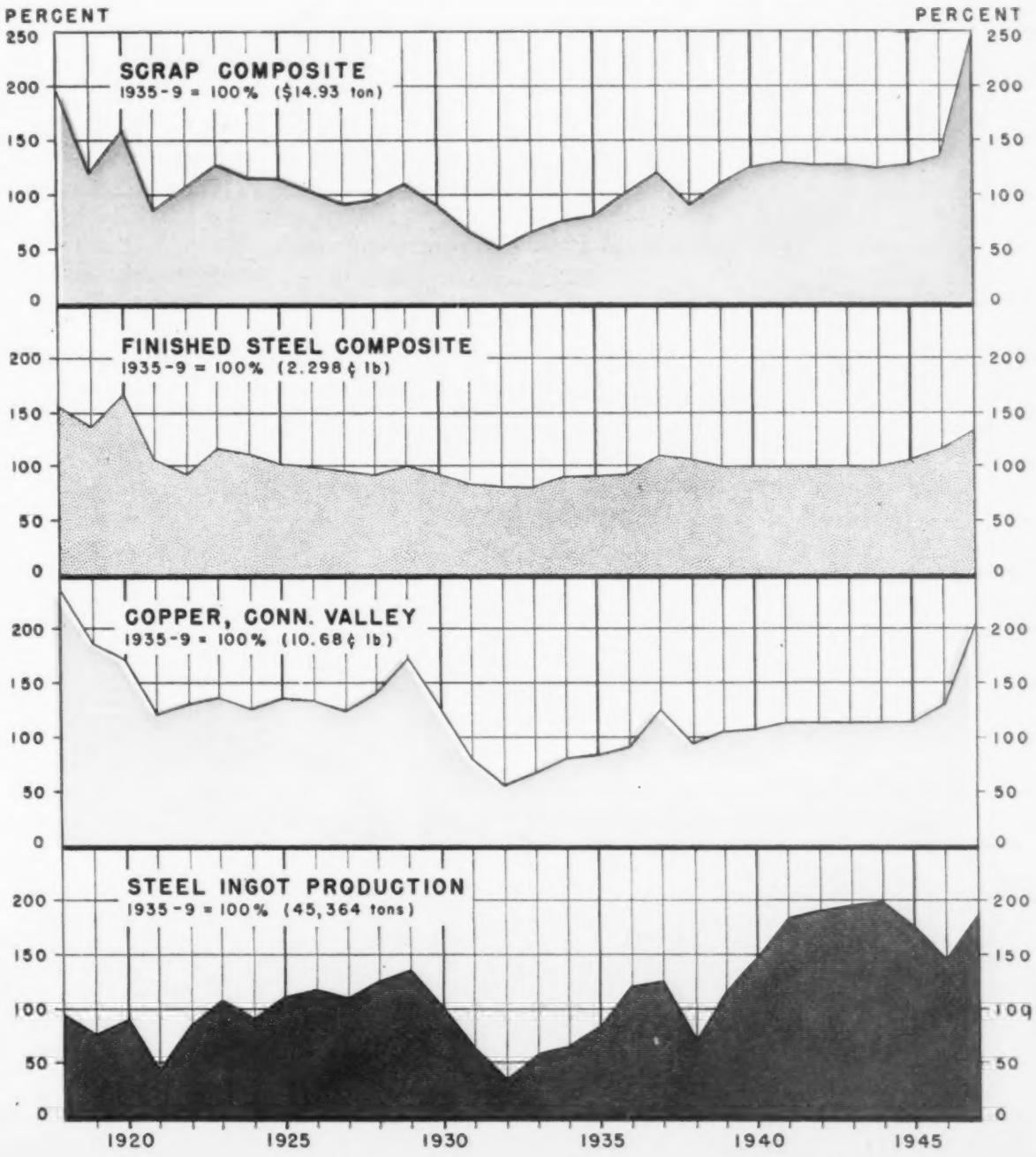
Index to THE IRON AGE 1947 Price and Production Statistical Section

PRODUCTION

By H. W. VAN CAMP
Associate Editor,
THE IRON AGE

• The year 1947 was the first since the beginning of the war when the prices of metals fluctuated unhindered by government controls. The pressures of wage increases and other increasing costs are to be seen in a study of the year's prices presented in this section. Trends in future price movements may often be forecast by relating previous experience with economic indexes such as production data on steels and nonferrous metals.

Weekly price and production statistics are published in each issue.



United States Steel Ingot Production

Openhearth, Bessemer and Electric Ingots and Steel for Castings—Net Tons

For data previous to 1922, see statistical supplement, THE IRON AGE, Jan. 4, 1940

Source: American Iron and Steel Institute

	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934
January	2,129,686	4,325,457	4,107,080	4,719,919	4,656,029	4,302,172	4,531,172	5,115,195	4,288,212	2,852,540	1,685,665	1,157,745	2,276,596
February	2,332,217	3,909,643	4,305,501	4,223,613	4,264,863	4,327,341	4,590,842	4,920,348	4,579,761	2,892,154	1,681,421	1,221,664	2,521,472
March	3,168,503	4,579,489	4,733,607	4,721,111	5,035,081	5,148,330	5,117,384	5,760,878	4,828,571	3,468,208	1,627,030	1,022,675	3,190,040
April	3,267,086	4,463,564	3,767,877	4,033,752	4,626,271	4,685,249	4,888,226	5,626,610	4,664,182	3,141,887	1,429,848	1,531,813	3,346,922
May	3,623,434	4,748,038	2,970,710	3,888,883	4,425,910	4,594,340	4,776,766	6,008,754	4,520,520	2,897,385	1,277,302	2,250,236	3,875,202
June	3,520,973	4,242,308	2,324,411	3,606,900	4,207,512	3,968,129	4,250,736	5,573,076	3,879,960	2,416,078	1,036,102	2,919,687	3,487,612
July	3,324,009	3,976,776	2,112,991	3,471,854	4,095,783	3,637,255	4,320,783	5,513,546	3,316,654	2,143,351	915,738	3,607,288	1,697,879
August	2,959,784	4,161,827	2,872,652	3,850,644	4,492,374	3,971,467	4,744,291	5,614,144	3,473,898	1,949,462	961,153	3,260,279	1,574,649
September	3,172,549	3,780,066	3,181,798	3,927,822	4,409,463	3,710,754	4,709,416	5,146,744	3,223,766	1,754,817	1,125,892	2,599,370	1,446,551
October	3,838,975	4,028,163	3,516,891	4,377,214	4,591,053	3,764,573	5,279,460	5,154,063	3,055,972	1,805,653	1,233,957	2,373,729	1,689,272
November	3,861,539	3,529,560	3,512,087	4,393,068	4,175,502	3,549,711	4,814,460	4,002,365	2,510,820	1,807,315	1,171,710	1,731,930	1,836,008
December	3,715,317	3,224,324	4,016,316	4,469,629	3,906,230	3,604,731	4,562,175	3,299,786	2,246,742	1,477,529	977,389	2,047,780	2,239,126
Total	38,914,072	48,969,215	41,421,921	49,684,409	52,886,071	49,264,052	56,615,711	61,735,509	44,589,058	28,606,379	15,123,207	25,724,196	29,181,329

	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947
January	3,279,411	3,474,353	5,398,326	1,984,815	3,663,004	5,764,723	6,928,085	7,112,106	7,424,522	7,592,603	7,204,312	3,872,887	7,213,246
February	3,169,849	3,379,587	5,050,824	1,942,795	3,448,120	4,525,797	6,237,900	6,512,535	6,824,604	7,194,009	6,652,765	1,392,682	6,422,062
March	3,273,848	3,810,436	5,970,247	2,293,884	3,929,387	4,389,183	7,131,641	7,392,111	7,674,578	7,826,257	7,705,929	6,508,764	7,307,486
April	3,017,120	4,494,782	5,801,540	2,196,413	3,431,600	4,100,474	6,756,949	7,121,291	7,373,703	7,593,688	7,289,887	5,801,195	7,042,697
May	3,009,189	4,614,529	5,894,260	2,061,169	3,372,636	4,967,782	7,053,238	7,382,578	7,549,691	7,702,576	7,449,667	4,072,620	7,329,497
June	2,580,723	4,543,888	4,787,710	1,868,848	3,606,729	5,657,443	6,800,730	7,015,302	7,039,353	7,234,257	6,840,522	5,625,773	6,968,665
July	2,591,191	4,473,940	5,212,832	2,259,677	3,648,639	5,724,625	6,821,682	7,144,958	7,407,876	7,498,387	6,985,571	6,618,683	6,570,154
August	3,331,707	4,782,442	5,580,683	2,903,805	4,341,726	6,186,383	7,600,957	7,227,655	7,586,464	7,498,913	5,735,317	6,924,522	6,982,086
September	3,227,815	4,744,841	4,907,592	3,029,736	4,881,601	6,056,246	6,819,706	7,057,519	7,514,339	7,235,111	5,982,475	6,555,566	6,788,642
October	3,590,878	5,182,430	3,881,819	3,554,912	6,223,126	6,644,542	7,242,683	7,579,514	7,811,117	7,620,885	5,596,776	6,951,742	7,560,365
November	3,599,619	4,941,014	2,464,793	4,072,676	6,292,322	6,469,107	6,969,987	7,179,812	7,371,975	7,278,719	6,200,466	6,457,771	7,249,523
December	3,511,636	5,056,843	1,685,273	3,583,253	5,958,893	6,495,357	7,163,999	7,304,540	7,255,144	7,336,170	6,057,937	5,760,501	7,550,000*
Total	38,182,986	53,449,085	56,635,899	31,751,993	52,797,783	66,981,662	82,927,557	86,029,921	88,836,366	89,641,575	79,701,624	66,602,706	84,984,423*

* Estimated.

Finished Steel Composite Price

(cents per pound)

Source: THE IRON AGE

• • • **Weighted average of** THE IRON AGE quotations on shipments of the following steel items: Hot-rolled and cold-rolled strip and sheets, hot-rolled bars, plates, shapes, drawn wire, standard rails and black pipe. Prior to 1947, wire rod instead of drawn wire, was used to weight the index. The composite was revised in 1941 to obtain greater sensitivity in reflecting price changes. This revision was described in detail in issue of Aug. 28, 1941, p. 92. Prior to 1941, this index was computed on the basis of finished steel shipments in the 10-year period 1929-39. The three years, 1941, 1942 and 1943, are based on annual shipments for the year. Since 1944, the index has been based on quarterly shipments. Averages on the old basis for previous years were published in the annual statistical supplement, Jan. 4, 1940.

	1929	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947
January	2.27758	2.07642	2.32263	2.58414	2.35367	2.30467	2.30467	2.28249	2.29176	2.27235	2.38444	2.54490	2.86410
February	2.27758	2.06513	2.32263	2.58084	2.35367	2.30467	2.30467	2.28249	2.29176	2.27235	2.38444	2.54490	2.87118
March	2.27623	2.05463	2.53185	2.57754	2.35367	2.30467	2.30467	2.28249	2.29176	2.27235	2.38444	2.54490	2.87118
April	2.30373	2.06220	2.58414	2.57754	2.35367	2.26015	2.30467	2.28249	2.29176	2.30329	2.42471	2.73011	2.88239
May	2.30723	2.06220	2.58414	2.56939	2.30807	2.30467	2.30467	2.28249	2.29176	2.30329	2.42471	2.73011	2.88239
June	2.31773	2.06680	2.58414	2.51300	2.28297	2.30467	2.30467	2.28249	2.29176	2.30329	2.42471	2.73011	2.88239
July	2.31213	2.13890	2.58414	2.35944	2.28297	2.30467	2.30467	2.28249	2.29176	2.30837	2.44076	2.70711	2.90953
August	2.29423	2.13890	2.58414	2.35944	2.28297	2.30467	2.30467	2.28249	2.29176	2.30837	2.44076	2.70711	3.18676
September	2.28225	2.14554	2.58414	2.35655	2.28297	2.30467	2.30467	2.28249	2.29176	2.30837	2.44076	2.70711	3.18925
October	2.26950	2.17210	2.58414	2.31964	2.28297	2.30467	2.30467	2.28249	2.29176	2.21188	2.44104	2.70379	3.18925*
November	2.26498	2.17210	2.58414	2.35367	2.28837	2.30467	2.30467	2.28249	2.29176	2.21188	2.44104	2.70379	3.18925*
December	2.27750	2.26276	2.58414	2.35367	2.30467	2.30467	2.30467	2.28249	2.29176	2.21188	2.44104	2.73347	3.18925*
Average	2.28839	2.11814	2.53620	2.45874	2.31068	2.30096	2.30467	2.29249	2.29176	2.27298	2.42277	2.67395	3.00891*

* Estimate.

United States Steel Ingot Production

Percent of Capacity

Source: American Iron and Steel Institute

	1929	1931	1932	1933	1934	1935
January	86.56	44.59	25.88	17.76	34.32	49.21
February	92.21	50.07	26.62	20.75	42.10	52.68
March	97.48	54.21	24.98	15.68	48.09	49.12
April	98.32	50.71	22.67	24.26	52.10	46.75
May	101.68	45.29	19.61	34.51	58.42	45.15
June	97.38	39.00	16.42	46.24	54.29	39.99
July	93.51	33.58	14.09	55.45	25.65	38.97
August	95.00	30.47	14.76	50.00	23.74	49.99
September	90.14	28.39	17.89	41.29	22.57	50.13
October	87.22	28.22	18.94	36.40	25.46	53.88
November	69.94	29.17	18.57	27.43	28.58	55.77
December	55.96	23.15	15.04	31.48	33.83	52.81
Average	88.76	37.99	19.67	33.52	37.37	48.68

	1936	1937	1938	1939	1940	1941
January	52.46	81.32	29.14	52.69	83.40	96.90
February	54.61	84.26	31.59	54.93	70.00	96.60
March	57.54	89.93	33.67	56.52	63.50	99.70
April	70.09	90.24	33.70	50.97	61.20	97.60
May	69.68	88.79	30.26	48.51	71.80	98.70
June	70.85	74.47	23.33	53.57	84.50	98.20
July	67.71	78.37	33.25	52.60	83.00	93.40
August	72.22	83.71	42.63	62.45	89.50	95.70
September	74.16	76.19	46.03	72.68	90.60	96.40
October	78.26	53.23	52.19	89.52	96.10	99.00
November	77.05	38.18	61.74	93.46	96.60	98.30
December	76.53	25.34	52.72	85.91	94.10	98.10
Average	68.45	72.33	39.60	64.53	82.10	97.40

	1942	1943	1944	1945	1946	1947
January	94.50	96.80	95.70	88.80	49.60	93.00
February	95.90	98.50	97.00	90.80	19.80	91.70
March	98.20	100.00	98.60	95.00	83.30	94.30
April	97.70	99.30	98.80	92.80	77.50	93.80
May	98.10	98.40	97.10	91.80	52.20	94.50
June	96.30	94.80	94.10	87.10	74.40	92.80
July	94.50	96.20	94.30	86.30	84.90	84.90
August	95.40	98.30	94.10	70.70	86.90	90.10
September	96.40	100.70	94.00	76.30	86.90	90.60
October	100.00	101.20	95.60	69.00	89.00	97.60
November	97.80	98.60	94.30	78.90	85.40	98.60
December	96.60	94.20	92.60	74.80	73.90	97.60*
Average	96.80	98.10	95.50	83.50	72.50	93.10*

* Preliminary figure, subject to revision.

(CONTINUED ON PAGE 274)

REVERE COPPER
and COPPER BASE ALLOYS
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COPPER and its alloys have long been favored by metal fabricators as materials of construction for pressure vessels, distillation columns, heat exchangers and other equipment for chemical plants. The ability of these alloys to be readily formed and easily joined by conventional methods, coupled with their good mechanical properties and high corrosion resistance, have made them preeminent in many applications.

However, the manufacturer of oxygen producing or handling equipment must consider more than the above-mentioned properties. He must insist that the materials used be immune to any adverse effects low temperatures may have. Many commercial alloys become increasingly brittle and lose their ability to withstand sharp blows as the temperature drops. But here again, there need be no worries with respect to copper and its alloys. Note the improvement at low temperatures in strength, ductility *and* resistance to impact for three copper base alloys:

Alloy (Annealed)	Temperature, °F.	Tensile Strength, psi.	Elongation, % in 2 in.	Impact Resistance—ft/lb, Izod Specimens
Deoxidized Copper	Room	31,400	48	43
	—292	58,000	58	50
Cupro Nickel, 30%	Room	70,800	41	90
	—292	112,700	51	97
Cartridge Brass, 70%	Room	51,100	49	66
	—292	73,500	75	79

(Tests on 0.25 in. diameter specimens)

Other Revere alloys, such as Herculoy (High-Silicon Bronze, A) show similar excellent properties at depressed temperatures.

Therefore, in designing oxygen plants, to play safe, specify copper-base alloys. Revere's Technical Advisory Service will be glad to assist in the selection of the proper alloys to meet your requirements.

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WALTER G. PATTON

• Auto industry smashed many records during 1947 . . . New truck, registration and wage totals set . . . 1948 may break all previous records.

DETROIT—The automobile industry can look back on 1947 with a real satisfaction despite brief shutdowns during the year for lack of steel. Only a handful of minor work stoppages plagued the industry. And the constant threat of a serious breakdown in the nation's transportation, while a threat to continuous production, was still only a threat.

During the year truck output was the highest in the history of the industry, aggregating 1,221,000 units. This is an increase of more than a third over the 1946 total. Similarly, the number of motor coaches built—19,000—set a record that was 90 pct above the total for the previous year.

The volume of replacement parts sold also reached new high ground, aggregating $2250 million or nearly four times the prewar figure and 28 pct over the 1946 record total.

Passenger car production, while failing to establish any new record in terms of units assembled, nevertheless achieved one of the best peacetime years in the entire history of the industry. From the standpoint of wholesale value of products it easily established a new record. As a matter of fact, the estimated total wholesale value of passenger cars, trucks and replacement parts reached the tremendous value of $7850 million, easily an all-time record.

Since both cars and trucks were bigger than prewar models and the physical volume of replacement parts was the largest in the history of the auto industry, the total tonnage of steel required by the industry in 1947 exceeded any previous peacetime year. The steel supply problem was undoubtedly the industry's most difficult situation. The fact that three auto producers, in addition to Ford, were actively engaged in the steel business before the end of the year was indication of the value auto producers had come to place on maintaining adequate steel supplies.

When U. S. passenger car and truck production figures are added to the Canadian car and truck output of 254,000 and 19,000 buses, the estimated total car and truck output for the year comes to 5,044,000 —the second 5 million year in the history of the industry.

MANY times during 1947 auto manufacturers found themselves struggling to maintain continuous production. One auto firm spent an average of $50,000 per week for special transportation by air, rail and bus to keep its production lines rolling. On one occasion, 50,000 lb of steel were shipped overnight from Buffalo to Detroit to maintain plant schedules. Another producer found it necessary to ship cars out of Detroit without carburetors and install them later in the field. At the same time, the total amount of expediting and special handling of materials required by all members of the industry was considerably less in 1947 than it was in 1946. The fact that strikes were fewer in 1947 made a lot of difference.

With steel short, many auto producers turned to aluminum and plastics during the year as a possible substitute material for steel. One producer announced that experimental work on 43 parts has been carried out; and several of the new aluminum parts are already in production. As a whole, however, the auto industry was using aluminum sparingly.

Plastics also got a break in 1947 because steel was short. One manufacturer has indicated that 58 individual parts which were formerly made of steel are now being made of plastic. The list includes horn buttons, interior paneling, dashboard dials and a long list of miscellaneous items. As one auto engineer put it: "In most cases it costs money to make the change to aluminum or plastics but it enables us to produce more cars."

With production of trucks and replacement parts at record-breaking levels, passenger car assemblies at a near-record pace and the amount of experimental engineering work undoubtedly at an all-time high, the auto industry easily exceeded all previous employment records in 1947. The total number of hourly employees on payrolls of car producers and their suppliers was estimated to be 790,000 compared with an average of 661,000 workers in 1946.

When salaried workers are included the number of workers directly engaged in the production of automobiles and automobile parts comes within easy reach of a million. Total factory payrolls of the industry haye been estimated to be $2300 million, a jump of 34 pct over a year ago and 71 pct higher than the 1941 total. Average hourly wages increased from $1.33 in 1946 to $1.47 in 1947 and the September figure was $1.52. The 1941 average was $1.04. Despite the fact that the industry was paying higher wages to more people than ever before in its history, it was almost certain that a demand for a substantial increase in wages would be made early in 1948.

AUTOMOBILE export business was both disappointing and satisfying. Considering the tremendous potential foreign market for cars and trucks, car producers were able to export only a figurative handful of new vehicles. Total passenger cars shipped abroad has been estimated at 264,000 or 7½ pct of the total units produced. The volume of trucks shipped to overseas buyers was much higher percentagewise and aggregated 21 pct of the total. The estimated number of trucks, 260,000, is only slightly less than the passenger car total. The prewar figures would show a

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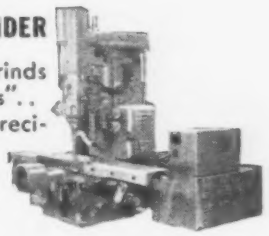

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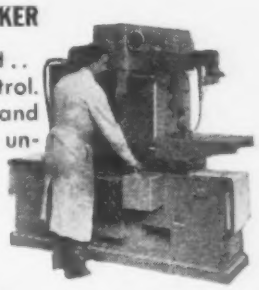

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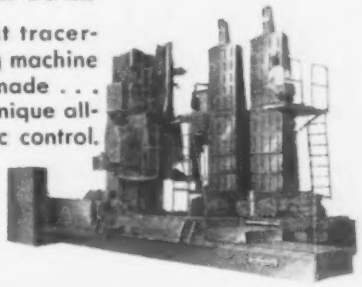

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much higher export of passenger cars over trucks, according to automobile officials.

While disappointing to some, the fact that the U. S. had limited its exports to 7½ pct of its passenger cars and 21 pct of its trucks while Britain was exporting 6 out of 10 cars and France was forced to ship 9 out of 10 cars to foreign markets was indicative of the rising standards of living in U. S. as compared with these other nations. Latin America, it was reported, has become Uncle Sam's best customer, replacing Europe and Far Eastern buyers.

As might be expected from the crowded condition of the nation's highways and its city streets, the total number of passenger cars registered in 1947 set a new all-time record of 37,164,405, an increase of 10 pct over last year and up 8 pct from the 1941 total. The country now has a million more passenger cars in operation than it had in 1941. Assuming the average motorist drives 10,000 miles per year, the national highway travel total hit 370 billion miles. Despite the fact that 3 million new passenger cars had replaced older cars on the highways, the average age of motor cars being driven today is 9 years, compared with a prewar average of 5 years. It was the age of the average motor car plus the presence of several million new potential buyers that heartened automobile executives every time it looked as if the market for new cars was slipping away because of constantly rising prices.

Despite high building costs the automobile industry completed a substantial number of projects during 1947. To be sure, the Ford and GM research projects were shelved and both Ford and GM abandoned projects to produce new light cars. However, Buick, Pontiac and Chevrolet among the GM divisions, Ford and Chrysler all undertook and brought to completion new major projects costing many millions of dollars. In addition to new buildings, the industry was spending millions for new tooling. An expenditure of $80 million by a single producer was reported. Another producer has added 4 million sq ft of floor space. New assembly plants for Ford, GM and Chrysler were springing up all over the country and Kaiser-Frazer was preparing to open a new assembly unit in southern California.

WHILE the newspaper headlines have recorded most of the problems faced by the industry during 1947, its real accomplishments—the satisfaction the industry has derived from its near record-breaking production, its unprecedented volume of work in plant revisions, the installation of new labor-saving machinery, new materials handling methods, considerable technical progress, and the definite progress made in the field of labor relations—have, for the most part, been only partially reported.

Within the next few years many of these accomplishments will begin to pay dividends. With plant capacity at an all-time high it would be easily possible to smash all auto production records during 1948 even though the year is destined to bring more new model introductions than any previous year in the industry's history. As auto executives looked to the year 1948, most of them were convinced that the industry's success or partial success during 1948 would be tied up with (a) the threat of materials allocations in which passenger cars would come out rather badly, (b) the amount of raw material diverted under the Marshall plan, (3) the actual increase in available supplies of finished steel, pig iron and scrap and (4) what Walter Reuther would do now that he is firmly entrenched as head of the big and powerful UAW-CIO.

There were many question marks facing the industry as it entered 1948. But somehow, the answers seemed to most observers to be at least a little closer than they were in 1947. If U. S. and Russia didn't get too involved during the year, this ought to be a record breaker for the industry, is what most people were saying.

Standards Assn. Seeks Correlation of All U.S. Building Codes

New York

• • • **Vice Admiral** George F. Hussey, Jr., USN (retired), wartime chief of the Navy's Bureau of Ordnance, recently joined the staff of the American Standards Assn. and on Jan. 1 will assume the duties of administrative head. Admiral Hussey will continue to serve the nation by directing the cooperative efforts of industry, consumers and government in the vital problem of standardization. Cyril Ainsworth, who for a number of years has been in charge of the technical activities of the ASA, will serve with Vice Admiral Hussey as director of operations of the ASA staff.

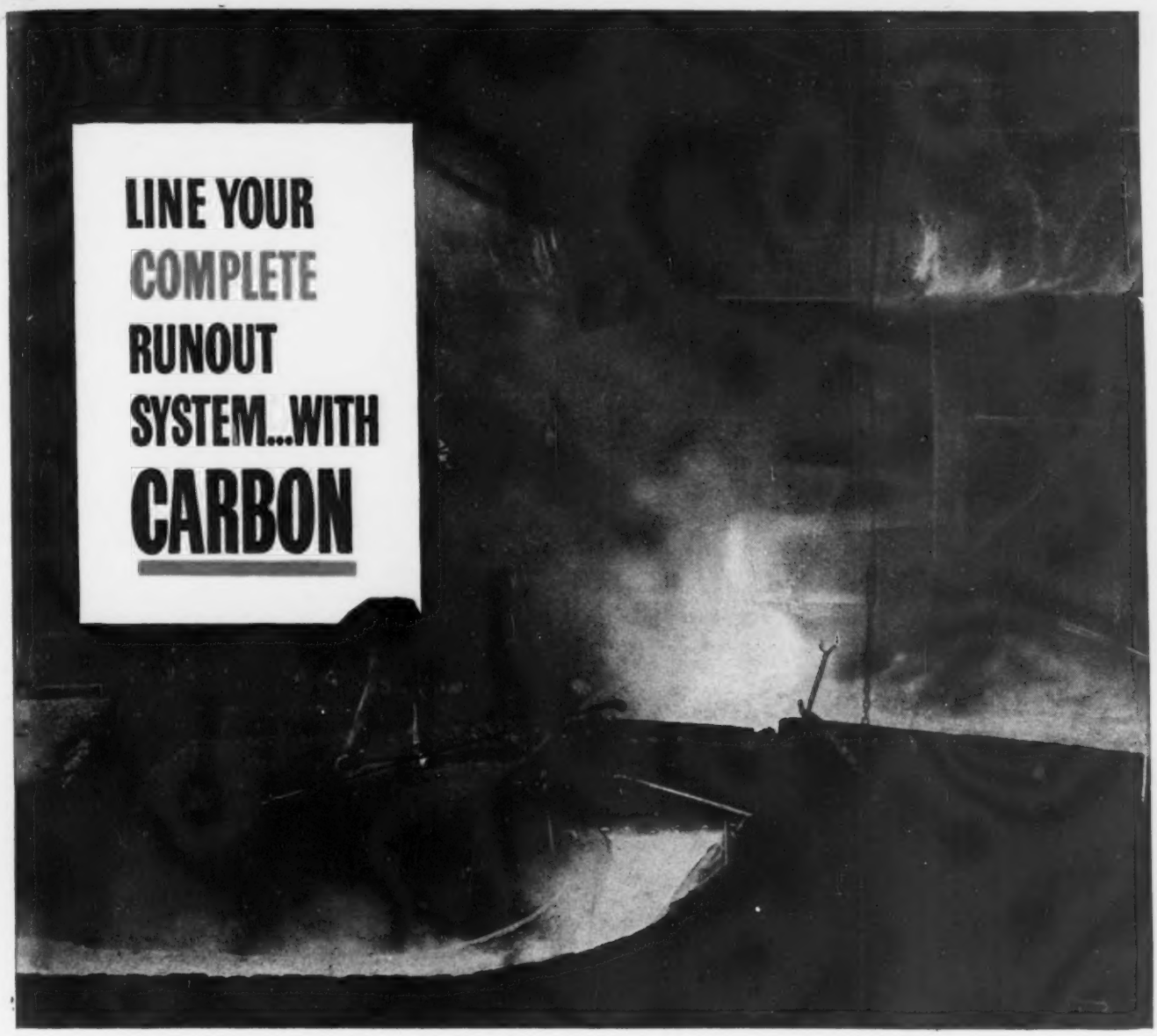
G. F. Hussey, Jr.

In the postwar standardization program, emphasis is being placed on building codes and building standards to help in eliminating outmoded building requirements and provide faster methods of construction; on safety codes to help prevent loss of manhours; on standard procedures for use by company engineering departments to save engineering and production time and expense; and on standards for identification of products to help the consumer in selecting the product best suited to his needs.

In addition to the fact that industry is using American Standard Safety Codes to reduce accidents and to encourage better labor relations, many of these codes form the backbone of state and federal safety regulations. There is effective cooperation between the American Standards Assn.'s industry members and state highway, utility, and traffic administrations.

The American Standards Assn. has also set up procedures whereby American industry can be kept in close touch with standardization developments in other countries and can have an opportunity to present its viewpoint in the early development of such standards.

This voluntary confederation of groups with apparently diverse interests has been dictated by the real interests they have in common. The ASA budget is subscribed wholly by private organizations.



● "National" carbon-block linings have for years been doing a fine job in blast furnace runout troughs —between taphole and skimmer plate.

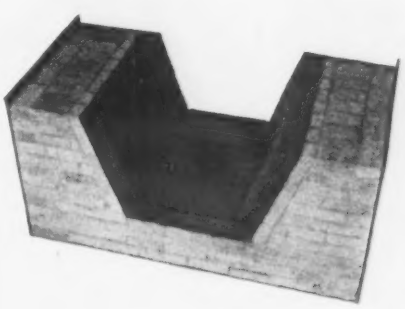
Why stop there?

Why not use carbon linings for the entire system, from furnace to ladle, and in the lead-in spouts of the pig machine as well? Carbon-block construction, shown at right, is recommended to the skimmer plate. Carbon bricks are most practical for the rest of the troughs.

Why use carbon?

Carbon outlasts other trough linings by months, even years. It is unaffected by thermal shock. Hot metal will not stick to carbon; so, if any skull is formed in the trough, it is readily removed. Furthermore, if you desulphurize in the trough, you'll find that carbon is highly resistant to desulphurizing agents.

Here is the recommended construction for a carbon-block trough between taphole and skimmer plate. Dark section is carbon. Light section is firebrick.



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Washington . . .

EUGENE J. HARDY

• Military research, development to be pressed vigorously . . . Seeks lighter weight metals, alloys, equipment for air transport . . . Long range program lined up.

WASHINGTON — With but little fanfare, in cooperation with civilian industrial experts and facilities, the Dept. of Defense is vigorously carrying on its program of research and development. Not only are the military services concerned about immediate problems but their plans are now well shaped for a long range program.

In addition to projects currently under way and those to be started during the remainder of the current fiscal year, numerous others have been outlined and scheduled for initiation during the fiscal years of 1948-49 and 1949-50. The extent to which the services are able to prosecute their programs will be dependent upon the funds appropriated by Congress for this activity.

While the character of the individual long range projects cannot be too sharply defined at the present time, nevertheless certain basic patterns are beginning to emerge. A number of these patterns which relate to the continuing overall program are of considerable interest to all of the metalworking industries.

One of the primary fields of research is concerned with the development of stronger and lighter metals; another centers on reaction of metals to extreme temperatures and their behavior in different climates, particularly cold climates. Still a third line of research is into the field of plastics and substitutes for metals.

Despite the developments in the plastics field during the war, military technical workers see much improvement needed. To date, while use of plastics is widespread for many items, no satisfactory substitute for metal has yet been found for many of the more critical military requirements.

IT is self-evident, in an age of fast-moving, mobile forces, that not only must all equipment for land and amphibious operations be as light and as readily handled as possible but that a large portion of military equipage would have to be transported by air, should an emergency develop. Hence the current search for lighter metals which will have the equivalent, if not more, tensile strength of those in use now.

"Future projects will be centered toward development of simplified operation and improved performance of mechanical equipment," the Army Dept. says. "Special or modified equipment is required for airborne and amphibious operations and for air transportability as well as utility under cold, tropical and other adverse conditions."

"Of equal importance," the Army emphasizes, "is the increased use of light metals and plastics where applicable and decreased weight-power ratio. Stress will also be laid on standardized groups of equipment and components to reduce spare parts requirements to a minimum."

Bridging and stream crossing equipment is well illustrative of what the Army is trying to achieve. Not only is the Corps of Engineers seeking bridge sections and equipment light enough to permit air transport but rugged and strong enough to withstand stream velocity and impact of floating debris. This will involve study and experimentation with lightweight metals, metal alloys, and improved methods of fabrication in relation to bridge design. Likewise, high on the development list is a lightweight pipe for petroleum distribution, lightweight pumps and lightweight tankage facilities.

Typical of the general equipment research planned is a project involving the forklift, largely a military development from the beginning. During the war, several hundred millions were expended for this type equipment which was essential for rapid handling of supplies; much more money was spent than should have been necessary because there was little standardization of construction which would have permitted exchange of spare parts.

THE Quartermaster Corps has embarked upon a program for standardizing this item. Tests are currently projected to test the use of aluminum and magnesium in construction of forklift pallets as well as other items of materials handling equipage such as conveyors, trucks, and trailers. An important phase of the forklift program is development of a standard, interchangeable motor.

The Army is delving deeply into general fields of equipment where lightweight, highly efficient metal equipment may be developed for air transport. In addition to the specific items mentioned, it is studying the possibilities for lightweight diesel locomotives, cargo trucks, portable repair and machine shops, magnesium and aluminum alloys for aircraft and related equipment such as landing mats and rotors for helicopters, and many similar fields.

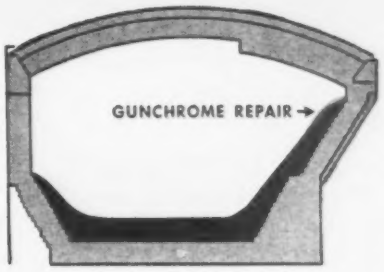
Specific research and development in the metals field will include the following:

Development of sheet which will have improved properties at temperatures of 1800°F or higher;

Investigation of new methods for forging large turbine wheels of high temperature alloys;

Development of new high temperature aluminum alloys and testing of high-strength structural alloys;

Development of high-strength



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Gunchrome is a chrome-base refractory containing chemical bonds. It is particularly suitable for use above the slag line for the repair of either acid or basic wall structures. The B. R. I. Gun was specifically designed to emplace Gunchrome and other gun products on vertical and semi-vertical walls.

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wrought magnesium alloys and continued investigation of magnesium casting alloys; and,

Investigation of titanium and zirconium alloys with reference to possible aircraft applications.

IT might be noted also that jet propulsion is apparently expected to be developed shortly to the extent that attention must be paid to special landing problems. Listed among projects for 1949 is development of a landing mat capable of withstanding heat blasts from plane jets.

An additional factor to which the Army is paying close attention is reaction or behaviour of various metals at varying temperatures and under different climatic conditions. Studies of the effect of tropical conditions, begun during the war, will be continued. Also, much greater stress will be laid upon how operations and equipment are affected by cold climate and Arctic conditions.

New developments are now tested in maneuvers currently conducted by the 2nd Division in Alaska and by the 82nd Airborne in winter operations at Pine Camp, N. Y. Also, the United States Army and the Canadian Army are cooperating in the improvement and enlargement of Fort Churchill, Manitoba, for the combined use of the two nations in testing cold climate equipage.

This Canadian region is considered as providing the most typical cold climate general conditions. Under present plans, Fort Churchill will be retained as a permanent base. Typical of cold climate operations to be conducted there are road, bridge, post, airfield and utilities construction; transport maintenance and other types of shop work; snow removal; mine detection; water and petroleum distribution; climatic effects on equipment, and many other activities.

RUST and other deterioration agents are likewise to be given intense study. Up to the present time, little work has been done on rust prevention. While there were a variety of preventives produced during the war, most of such developments was on a trial and error basis. Because of the large amounts of equipment which must be maintained in standby condition, the Army is concentrating a great deal of attention on this subject.

The Army program may be summed up roughly under three headings — current projects, those to be started in 1948, and those to be initiated in 1949. In broad categories, some of the more important are:

Current projects: single unit crushing and screening equipment; truck-mounted cranes, particularly heavy-duty types; improved, lighter landing mats; lightweight pipe; collapsible gasoline storage tanks and containers; dump trucks—2½, 5 and 10-ton; an airborne tank and self-propelled 105 howitzer; lightweight portable shelters; lightweight deisel locomotives; new aluminum alloys for aircraft wing structure and integral stiffened magnesium wing structure; nonmetallic materials such as plastics and woods; and many others.

Planned to begin 1948-49: mobile oxygen and nitrogen plants; deisel piledriver; armored bulldozers; water converter (from ice and snow); flexible pipe for stream crossing; standard industrial type military engine; general mechanical equipment for cold climates; and others.

Scheduled for 1949-50; airborne construction equipment; complete mobile hydrogen plant; 75-ton capacity crushing and screening plant; heat resistant landing mat; water developing, pumping and related equipment for Arctic operation; mobile and fixed maintenance and machine shops; 20-cu yd dump truck and hoist; a non-metallic structural component for high-speed aircraft and guided missile; and others.

It is inevitable that these projects will have to be revised to meet changing conditions as the program goes on. Likewise, the basic research involved may be expected t be continually opening up new fields, thereby requiring establishment of entirely new projects not now anticipated.

In general, contracts for pure research will not be wrapped up under security, the Army says. It believes that should such research reveal some line that warrants a security classification, the civilian agency will refer the matter to the Army and recommend such action. In this way, it is held, freedom from classification will not outlaw or prohibit free discussion and exchange of ideas and will lead to better results from the program.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

West Coast . . .

ROBERT T. REINHARDT

• High rate of industrialization continues in the West during 1947 despite economic handicaps which may be over-rated.

SAN FRANCISCO — Without much effort it is possible to draw from the steaming cauldron of minor labor disputes, material shortages, power shortages, "discriminatory" freight rates and the general confusion resulting from accelerated industrialization, the essence of the conclusion that 1947 was a good year for western business.

From Los Angeles on the south to Seattle on the north, hundreds of new industries were established and millions of dollars invested in expansions. Manufacturing payrolls continue to increase and employment is at near record peacetime heights. With few exceptions, western corporations are showing at least modest profits and some record earnings.

Industrial growth in the Los Angeles area for the first 11 months of 1947 can be measured at $119,821,500 which exceeds the total factory investments for the five prewar years of 1936 to 1940. In that 5-year period industrial development accounted for investments totaling $118,570,000, according to Carleton B. Tibbetts, chairman of the Industrial Development Committee of Los Angeles Chamber of Commerce.

The Los Angeles area anticipates 1947 will wind up as the third biggest year in factory growth, exceeded only by the war year of 1943 when industrial investments reached $161,953,996 and by the peacetime boom year of 1946 when $155,838,492 were invested.

In the first 11 months of the past year 200 new factories were established in the Los Angeles area with a value of more than $68 million and there were 382 plants which increased their facilities at a cost of approximately $51½ million. Approximately 13,000 new jobs were provided by these developments.

Twelve counties in the San Francisco Bay area report that in the first ten months of the past year 327 new plants were established with an investment of $41,170,900 and that 233 expansions were made with an investment of approximately $63 million. For the same period in 1946, there were 487 new plants established with an investment of approximately $48 million and 384 expansions took place with an investment of approximately $55 million. Both of these periods represented numerically greater development than the similar period in 1945 when 260 new plants invested approximately $39 million and 232 industries expanded, making investments of approximately $61½ million.

In discussing the developments now taking place throughout the state, G. L. Fox, manager of the Industrial Dept., San Francisco Chamber of Commerce said: "While the rate of industrial development being experienced throughout Calif. is unprecedented, it would appear that this excessively high rate will continue in terms of years rather than in months because of the magnitude of the western market growth.

"The real impact of California's jump in population of more than 2.9 million since 1940 is just being recognized." He further pointed out that this mass of people represents the population of any one of 32 states in the union.

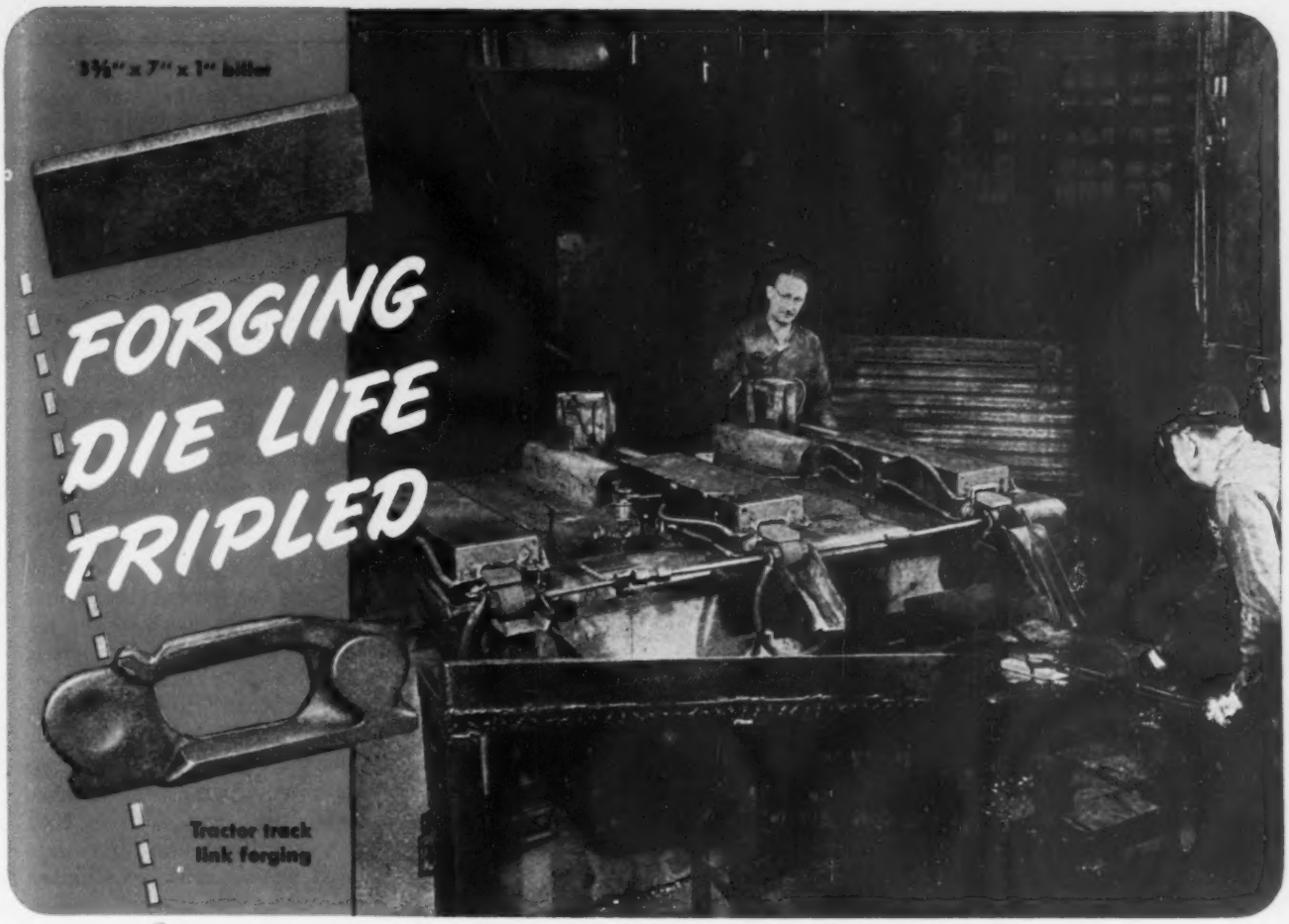
In summarizing California's business and industrial activity for the first 9 months of 1947 in relation to 1946, James E. Shelton. Los Angeles, first vice president of the State Chamber of Commerce, reported higher employment levels than a year ago; upward trends in construction and factory output; and a 5 pct increase in cash farm marketings.

"California manufacturing — after spring curtailment — resumed an upward trend this fall," said Mr. Shelton. "Total factory employment has decreased since the September peak, due to normal seasonal curtailments, but most of the important non-seasonal industries show a moderate upward trend since July. October's total employment of factory wage earners, 505,500, was about the same as a year ago, with factory payrolls about 9 pct over 1946 levels," he added.

The state of Washington, and Seattle particularly, has enjoyed an industrial growth comparable to that of Calif. and it is reported that in the first 8 months of 1947 Seattle industries invested approximately $48 million in 403 new plants and expansions. These developments are said to have created 4,000 new jobs.

Total figures on industrial developments in the Portland area are not available for the preceding year but from monthly reports it is evident that several hundred new companies have located plants in the Portland area and that industrial growth is keeping pace with the approximate 39 pct increase in population in the state of Oregon during the past 7-year period. One of the most recent large developments in this area is the construction of a $1 million plant for the Continental Can Co.

Obviously, the industrial expansions taking place throughout the West are closely tied up with the phenomenal increase in population experienced in practically all western states. As reported by the Bureau of Census, the civilian population increase of six western states between 1940 and 1947 was: Calif., 42 pct; Wash., 27 pct; Ore., 39 pct; Ariz., 30 pct; Utah, 15.5 pct; and Nev., 26 pct. Idaho was the only one of the seven western states to show a decline which was reported as 7 pct. The Bureau has estimated that more than one third of the entire civilian population



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growth of the country between 1940 and 1947 occurred in the seven western states. For the country as a whole, civilian population growth reported during those seven years was 8.5 pct of the 1940 population, whereas for the increase for the seven western states was 35 pct. The gain in the three Pacific Coast states was reported as 40 pct.

Western industry is out to develop the market represented by this population gain and is using every device possible to make people of the West conscious of its approaching industrial integration. The San Francisco Bay area is planning an 8-day industrial exposition for July and Los Angeles, Seattle and Portland are likewise developing industry promotion programs on a heavier scale than ever before.

While chambers of commerce gloatingly release figures on industrial development, there are behind-the-scenes problems which still need solution before the West can take its place in industry on a basis comparable with the East.

Among the headaches facing manufacturers today are power shortages; labor rates higher than elsewhere; and freight rates which exact penalties on incoming raw materials and on outgoing finished products.

It is no secret that the once abundant electric power supply of the Pacific Northwest is proving inadequate for all demands of the moment. The same situation exists to a lesser degree in Calif. and Ore. It is true that plans are on drawing boards and that in some instances construction has begun for the enlargement of power development facilities and it is generally believed that the curve of consumption which has been rising rapidly will level off sufficiently to carry industry through until new hydro-electric plants are completed in the West.

The power shortage is considered to be nationwide and is brought into sharp focus in the West because of the rapid growth of the area. The Pacific Northwest places its hope in construction of the McNary and Foster Creek dams long advocated by the Bonneville Power Administration. In Calif. the Pacific Gas & Electric Co., a private utility, has underway a 5-year, $300 million expansion program designed to add approximately one million hp to the company's power capacity which would then be 3.5 million hp. In southern Calif. which develops most of its power through generators at Hoover Dam, there has been no definite shortage of electricity although reopening of the aluminum reduction plant at Torrance was discouraged largely because of the heavy drain it would make on the power supply.

No ready solution is in the offing for the problem of overcoming labor costs higher in the West than are those encountered by eastern and mid-western manufacturers. It was recently pointed out by Ralph Pryne, president of Pryne & Co., Inc., Pomona, Calif., that California metalworking manufacturers are now paying the highest wages in the world. This same situation exists in various degrees in the aircraft, shipbuilding and construction industries. Most industrialists are staking their hope for equal or competitive production costs on a higher productivity of labor which would justify the differences in wage scales. However, it is difficult to find an industrialist who will concede that western labor is in any degree more productive than similar workers in eastern branches or independent operations.

There have been few major production shutdowns because of labor difficulties although the Northwest has experienced difficulty in the metalworking field, but the strikes were of short duration. Auto mechanics of Seattle were a few weeks ago rounding out their 6 months of striking with but little indication of an early settlement. In general, there has been but little labor trouble and since passage of the Taft-Hartley Act there appears to be a sincere effort upon the part of union leaders to work with business to establish solid and mutual cooperation. The influence of communists in the labor movement is being closely watched. Well known leaders of employers' groups, such as Almon E. Roth, president of the San Francisco Employers Council, are urging industrialists to screen out all communists and disloyal persons at the time of hiring and also require a loyalty oath as a condition of employment. So far as can be determined, this practice is not becoming universal as yet.

From one end of the Coast to the other, the matter of freight rates is of paramount consideration. There are manufacturers in the West who insist that they are being penalized by rates which make shipment of their raw materials costly and which place them in an unfavorable position competitively when shipping finished goods to the East.

The temporarily established rate on finished steel from Geneva, Utah to the Coast remains in effect and a decision as to its permanency will not be given until after a hearing scheduled for January or February in San Francisco before the ICC. With the recent 10 pct increase effective throughout the nation, this rate to San Francisco, Los Angeles and Portland is now 52.8¢ per cwt and to Seattle it is 59.4¢ per cwt.

Kaiser Co., Inc., Iron and Steel Div., is now shipping semi-finished steel and pig iron to the East under a specific commodity rate which on semifinished to Chicago is $19.58 per gross ton and to Willow Run and Detroit, $21.58 per gross ton. Pig is being shipped under this rate to Cincinnati and Newport, Ky., at $18.70 per gross ton.

No relief has been afforded this company in shipments of coal from Utah and other raw materials moving to their Fontana steel plant, although the company contends that in view of rates granted to Geneva Steel Co. it is being penalized.

The Permanente Metals Corp., operating the aluminum rolling mill near Spokane, Wash., is still attempting to secure more favorable freight rates on the eastern movement of their finished and semi-finished products.

Portland, Ore. is seeking a crating-in-transit rate on manufactured goods headed for export but has met with no success. It is the contention of the Portland Traffic Assn. that Portland should enjoy the same rates as do the Gulf ports.

The present and potential volume of industrial business in the West so far outweighs what are doubtless serious difficulties in individual instances that most observers are confident that the year 1948 will, on the whole, be uniformly prosperous for the West.

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PERSONALS

° ° °

• **R. B. Gerhardt,** chief engineer of construction, Bethlehem Steel Co., Bethlehem, has retired. Prior to his appointment to that position in 1938, Mr. Gerhardt served for a number of years as assistant general manager at Bethlehem's Sparrows Point and Steelton plants. He will be succeeded by **L. J. Gould,** assistant chief engineer of construction since 1939, and prior to that time assistant superintendent of the mechanical department, Sparrows Point, for 12 years. Mr. Gould's successor will be **A. J. Fisher,** fuel engineer at Sparrows Point since 1929.

• **O. W. Carpenter** has been appointed vice-president in charge of finance and accounts; **B. F. Devine,** vice-president and manager of the construction machinery division, and **L. B. McKnight,** vice-president, responsible for operations of two heavy machinery divisions of Chain Belt Co., Milwaukee.

• **Walter J. Case** has been appointed manager of the electrical, wire rope and construction materials department in American Steel & Wire Co.'s district sales office at New York. Mr. Case started work with American Steel & Wire as an office boy in 1923. He advanced through various positions as clerk, order checker and salesman to the assistant managership of the department he now heads.

• **Irving Grombacher** has been appointed president of Royal Metal Mfg. Co., Chicago, and **Joseph K. Salomon** has become Royal's general manager, taking over the position vacated by Mr. Grombacher. Mr. Grombacher's ascension to the presidency comes after over 25 years of service with Royal Metal. Since June he has been executive-in-charge and acting president, succeeding Joseph M. Miroff, retired. Mr. Salomon is a veteran of over 20 years with Royal.

• **R. W. Wire** has been elected president and general manager of Loffland Bros. Co., Tulsa, Okla. Prior to his election, Mr. Wire was sales manager of the southwestern area for the National Tube Co.

• **Martin Hotham,** formerly special engineer for Follansbee Steel Corp. at Follansbee, W. Va., has accepted the position of open-hearth superintendent at Wickwire Spencer Steel Co.'s Buffalo works.

• **George Collingwood** has been named foundry superintendent of Pontiac Motor Div., General Motors Corp., Pontiac, Mich. He has been assistant superintendent, and succeeds Dallas Amburn. Mr. Collingwood came to Pontiac in 1934 and was appointed assistant to the general foreman of the foundry in 1941.

• **Tom K. Smith, Jr.,** has been appointed assistant branch manager of the phosphate division of Monsanto Chemical Co., St. Louis. Mr. Smith will be in charge of the Cincinnati branch of the division's Detroit office. He has been associated with Monsanto since 1939, except for the period from 1941 to 1946 when he served with the Army Ordnance.

• **Robert E. Busey** has been appointed assistant chief engineer at Willys-Overland Motors, Toledo. Mr. Busey, former executive engineer for the White Motor Co., serves as direct assistant to Walter D. Appel, chief engineer, in the coordination of body and chassis engineering for passenger cars, trucks and Jeep models, assuming the responsibilities formerly carried by **Walter Benning,** who has been named a special assistant to Mr. Roos.

• **James E. Merchant** has been appointed manager of the Cleveland operations of Columbia Steel & Shafting Co., Edgar T. Ward's Sons Co. Div. and Summerill Tubing Co. Div. He succeeds **Paul W. Butz,** who has served as manager in Cleveland for the past 3 years. Mr. Butz is being transferred to the managerial position at Detroit. Mr. Merchant has been with these companies for 11 years. He was originally employed at Cleveland and later transferred to Dayton in sales work. For the past 6 years he has been manager at Cincinnati.

• **Galen S. Woodruff** has been appointed sales engineer in the Cleveland office of Udylite Corp. He comes to Udylite from Lincoln Industries, where he was a foreman plater.

• **Frederick E. Munschauer, Jr.,** works manager of the Niagara Tool & Machine Works of Buffalo, has been elected a director of the company to succeed **Clifford D. Coyle,** retired.

• **George L. Ziegler,** assistant chief engineer of the engine division of the Worthington Pump & Machinery Corp., has been appointed assistant to the manager of the company's Buffalo works. He has been with the company since 1925.

• **E. T. Cuddeback** has been named manager of the Allis-Chalmers Mfg. Co.'s Tampa, Fla., district office., succeeding **A. D. Robertson,** who has resigned. For the last year Mr. Cuddeback has been sales representative in the company's Atlanta district office.

• **Charles L. Dudley** has been made director, secretary and treasurer of Jenkins Bros., Bridgeport, Conn.

• **Robert T. Keller** has been named vice-president of the marine and industrial engine division of Chrysler Corp. He also assumes the duties of general manager with headquarters at the Chrysler Jefferson plant, Detroit. Mr. Keller joined Chrysler in 1936.

• **A. B. Muskett,** formerly associated for many years with the Ford Motor Co., Highland Park and River Rouge plants, also more recently with General Motors Corp., Detroit, in executive capacities, has been appointed manager of manufacturing of the General Electric X-Ray Corp. in Milwaukee, a division of the General Electric Co. Prior to joining GE X-Ray, Mr. Muskett was a manufacturing consultant in GE's executive department.

OBITUARY...

• **Charles F. Conn,** sales manager of the distributor and replacement parts division of the Trico Products Corp., died Dec. 20. He joined Trico in 1922.

• **Lee V. A. Smith,** 43, Buffalo representative of the Lustra Corp. of New York, died Dec. 16. He was formerly a salesman for the Graybar Electric Co. in Buffalo and Dallas.

European Letter . . .

• Russia also suffers from inflationary aftermath of major war . . . Disregarded money eventually takes its revenge . . . Object of any disinflationary policy is to reduce incomes and expenditures of the people.

LONDON—It is said that President Truman, by appealing to Congress for the reinstatement of some of the wartime controls, helped the Labor Party to win the by-election at Gravesend. Now Mr. Stalin has come along to help the Tories at Paisley by decreeing as thorough a piece of deflation as the world has ever seen. It is indeed a topsy-turvy world when state controls can be put on to save the free enterprise system and when the high priest of communism can pay homage to the efficacy of market prices.

Russia is suffering from exactly the same disease as the rest of the world, the inflationary aftermath of a major war. Whether the Russian inflation is more or less severe than those of the Western countries it is impossible to say. But what is quite clear is that Mr. Stalin has been much keener in his analysis of the trouble and much more forthright in the steps that he has taken than any economic statesman of the Western victors. Indeed, the only other government that is conducting an equally purposeful campaign against inflation is that of Italy, under the leadership of Signor Einaudi.

The Russian measures certainly have plenty of brutal logic, and the logic at least is to be admired. Is there too much money chasing too few goods? Very well, let all money lose nine tenths of its value. Once again Mr. Stalin shows how little he cares for the doctrines of Marx when he sees the necessity for a definite economic policy. Nothing could well be less Marxian than the economics of the 5-Year Plan, which is a deliberate attempt to deprive the laboring masses of a far higher proportion of the fruits of their labor, for the sake of capital, than any private employer ever tried to do.

And deflation equally, according to the Marxists, is a capitalist trick to cheat the workers. Indeed, Mr. Stalin is much more of a capitalist than a socialist. His system is entirely devoid of any humanity; but it is equally free from muddled thinking. Unfortunately what Social Democracy is offering as a counterattraction is a system that appears to eschew facts and logic as much as it dislikes brutality.

ALL over the world inflation is now the enemy of progress and balance and sanity. There is no secret about the nature of inflation: It is an excess of demand for everything over the supply of everything. Nor is there any secret about where it came from. Wars always breed inflation, and big wars breed big inflations. Inflation springs from the wartime habit of disregarding money. For waging war it is an excellent habit, like other wartime habits such as the disregard of pain and destruction and carelessness about human life.

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In the early months of the late war much impatient vehemence was expressed at the slowness with which Mr. Chamberlain and his colleagues were converted to the idea that money did not matter. Later the conversion was complete—so complete that Mr. Greenwood could refer to pounds, shillings and pence as "meaningless symbols" and even Lord Keynes could talk about the "humbug of finance."

But like so many of the habits of wartime, disregarded money eventually takes its revenge. For money cannot be wholly disregarded. It is so valuable a social invention that men go on using it. Nor can it be wholly deprived of its functions. Where it exists, it persists in attracting goods, and where it exists in excessive volume it persists in attracting too many goods. Industrious bureaucrats build walls to contain it, they dig ditches to drain it off. But the National Savings ditches get silted up, and the walls have to be built ever higher and wider.

Whatever the efforts that are made to control it, a flood of money is never effectively contained. There is always something that it can be spent on, and every expenditure uses up some scarce resources. If the flood of money is held back from the essentials of life by price control and rationing, and diverted to inessentials the distortion of the economy is only the greater. The attraction of surplus money is so great that industry is sucked dry of its working capital and the flow of production suffers as a result.

All this has happened many times before, and if they had been less confident in their ability to control economic forces the postwar governors of the world might have learned something from the lessons of the past. One of these lessons is that the public has never been prepared to admit, in the middle of an inflation, that anything was wrong with their incomes or their expenditures: "Worldwide shortages" have always borne the blame, just as slumps are regularly blamed on "overproduction." Both explanations, of course, are fallacious: What is wrong in an inflation is that demand is too large and in a deflation that it is too small.

THE only people who have shown themselves clear in their heads about this problem are the extremists, the Soviets on the one hand and such "old-fashioned" Liberals as M. Gutt of Belgium or Signor Einaudi on the other. Those in between, including virtually the whole of the Conservative

(CONTINUED ON PAGE 232)

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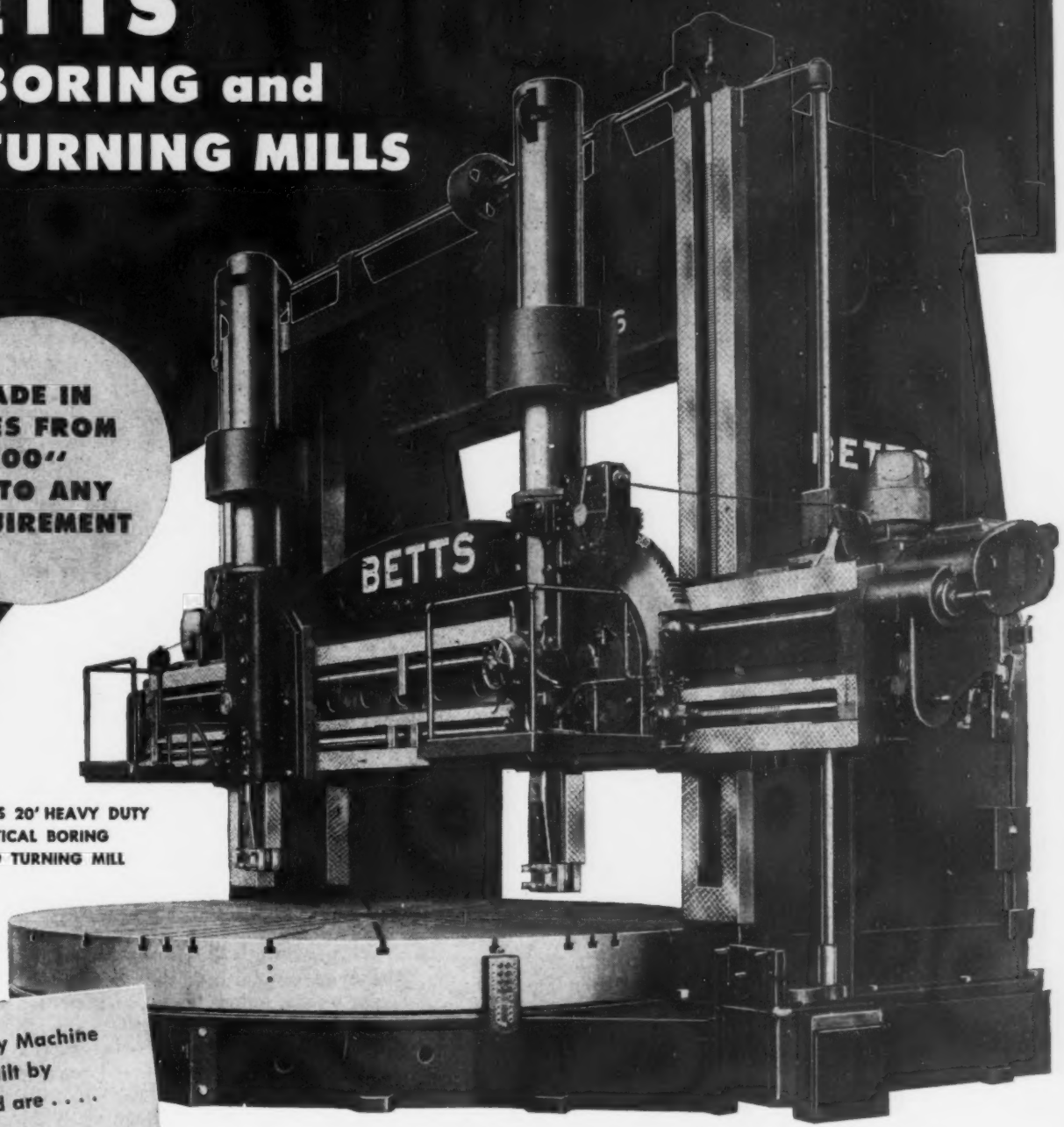

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Industrial News Summary...

- **Steel Industry Has Friends**
- **Buyers Understand Problems**
- **Pig Iron Advanced $2 a Ton**

WITH widespread misconceptions over the need for steel allocations and the extent of the steel gray market rampant throughout the country, the steel industry needs friends—but it has them in an unexpected corner. A fresh survey taken by THE IRON AGE among steel customers shows that 84.3 pct say their relations with steel companies are "good." When it comes to brickbats only 5.1 pct of the steel customers answering the survey said that their relations with steel companies were "bad." On the fence and capable of being knocked either way are 10.6 pct who were "indifferent" in their relationship with steel companies.

Although the industry has been pushed from pillar to post by the public and the administration, 74.1 pct of its customers have no intention of changing their source of supply when things become easier. Only 8 pct of those answering the question "Do you expect to change your source of supply when normalcy returns?" said "yes." Some steel customers were still trying to make up their minds what they would do when they could have their choice on steel deliveries—17.9 pct saying "maybe" they would change their source of supply. Pressure on the steel industry became more intense as 1947 came close to an end but steel customers were taking a much broader view of the industry's troubles.

In March 1947 another IRON AGE survey on the same question of whether or not customers would change their source of supply showed then that 63 pct would not change, 19 pct said they would and 17.5 pct said they might. The result of the most recent survey, which was taken in November and December, shows steel customers feel far more kindly toward their sources of supply than is now generally thought. The questionnaire sent out by THE IRON AGE went to a cross-section of steel users in 1850 companies. Almost 28 pct of this group sent back answers to the queries.

STATISTICIANS and some government officials have at times been worried about the size of steel inventories. No such worries, however, are held by steel customers, who continue to buy every ton of steel that is not nailed down. Furthermore, the shortage of steel and the lack of inventories continues to cause a boom in the steel gray market even though the latter constitutes only about 5 pct of total steel shipments.

Proof of these contentions is found in answers to the question "are your inventories above normal, normal or below normal?" Bearing down on their fountain pens and pencils 52.8 pct of the industry's customers said their inventories were below normal. Forty-one pct of the steel consumers thought their inventories were about normal compared to present day demand, while only 6.2 pct believed that their steel stocks were above normal. All gave the impression that stocks were at times unbalanced. If these figures are to be believed—and they come from top-notch steel buyers throughout the country — there appears to be no question in the immediate future over top-heavy steel inventories.

The answers by steel buyers in THE IRON AGE special report are considered highly significant in view of the current demand from administration sources for allocation controls. If the steel industry's customers don't know what kind of a job is being done in the production and distribution of steel then nobody does. The good bill of health given the industry by its own consumers indicates that 1947 was a year of miracles in the output of 85 million tons of steel ingots or more than 62 million tons of finished steel products.

WHILE steel buyers sincerely sang the praises for the industry there has been no let up in demand for steel products. Part of this drive to get on mill order books has been caused by some customers who fear that with even a voluntary allocation plan they will be left out in the cold. As the news points up the possibility of allocation agreements between the government and steel firms, more customers are becoming jittery. This feeling is expected to increase rather than diminish until the whole question of allocations has been definitely settled.

With several large pig iron producers having raised the price of pig iron this week $2 a ton and others expected to follow, steel customers are expected to again become more price conscious. Many steel users currently paying gray market prices to other steel customers who have received more steel than they actually need would be more than willing to see legitimate mill steel prices advanced if it meant the end of the gray market. There was this week still the possibility of higher steel prices if wages were to be advanced in April 1948—a possibility which is far from remote.

Scrap—a major worry with steel companies—started to move again this week with an average advance of 75¢ per ton in the Chicago district. No changes were made in the other important scrap consuming districts, Pittsburgh and Philadelphia. Because of the Chicago change THE IRON AGE scrap price composite advanced 25¢ a gross ton this week to $40 a gross ton. Both buyers and sellers are watching the market closely, since both believe a major test of recent lower quotations is at hand. No important action, however, is expected to be taken until after the first of the year.

As expected, steel ingot output made a sharp rebound following the Christmas holidays. The rate is up 9 points this week to 97 pct of rated capacity and is only 1 point below production in the week before the holidays. The rate is expected to hold around current levels for some time to come.

• **U. S. PRODUCTION**—Steel ingot output for the past year is estimated to have totalled 85 million net tons. This compares with the 1946 output of 66.6 million net tons, when steel and coal strikes cut deeply into the total output. United States output has been running at above 90 pct of the theoretical capacity steadily since September of last year, and has dropped below that level only twice for brief periods within the past year.

• **LUXEMBURG**—Fighting the constant shortage of coking coals usually imported from Germany before the war, Luxemburgian steel mills produced an estimated 1.7 million net tons of steel ingots during the past year, in comparison with 1.3 million tons during the previous year. Substantially increased coal imports during the last half of the year contributed to the increased output.

• **CANADIAN PRODUCTION** — Steel ingot output during 1947 in Canada is estimated at 2.9 million net tons, compared with the 1946 total of 2.3 million tons. The latter figure was for a seriously strike-bound year. Raw materials shortages have been an even more serious problem for the Canadian industry than they have in the United States.

• **BELGIAN PRODUCTION**—Steel ingot output, despite serious coal and coke shortages in Belgium during the past years, totalled 2.6 million net tons during 1947. This figure compares with a production of 2.4 million tons during the previous year. More than half of Belgian steel output is being shipped out in the form of direct exports, despite a tremendous accumulated domestic demand for steel products.

• **GERMANY**—Following an almost complete breakdown of steel production during a winter transport breakdown, production in Western Germany improved somewhat in later months. Total output for the year is estimated at 4.1 million net tons of ingots for the year, compared with 2.7 million net tons during 1946. The character of German production has altered somewhat with low grade German iron ores being used, and considerably more scrap being charged than was the prewar custom. First shipments of high grade Swedish ore since the war arrived in Germany in the last months of the year.

• **FRENCH PRODUCTION**—Steel production in France recovered sharply during 1947, with the level of 1938 output, which was the first goal of the industry being passed during the last quarter of the year. Imports of coal were primarily responsible for the rapid improvement. Estimated ingot output for the year totalled 6.6 million net tons. This compares with production of 4.5 million tons of ingots during 1946.

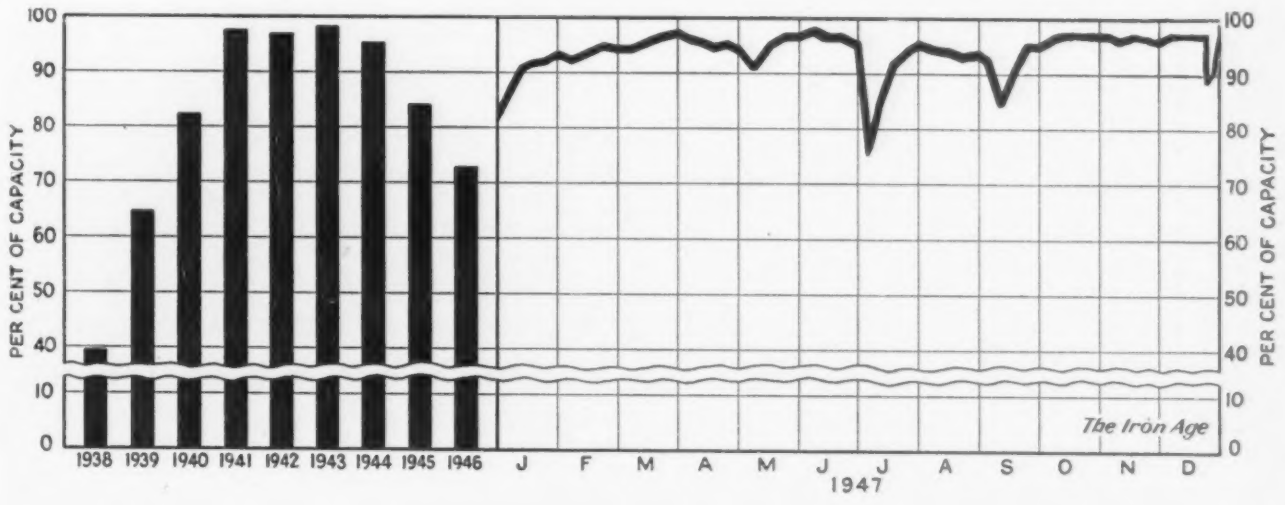
• **BRITISH OUTPUT**—Production made a sharp comeback in the last quarter of the year after a dismal start due to fuel crisis early in 1947. March output was most seriously affected, and the full operating momentum was not regained until the last quarter. Total steel production for the year is estimated at 14.1 million net tons. These figures compare with 14.3 million net tons of ingots and castings in 1946. Most of the year was spent by the government in approving expansion programs for the industry, although some of the major units of the plan are under way. There is some question as to the approval of a universal beam mill for Dorman Long & Co., due to the restudy of capital expenditures.

• **GERMAN SCRAP**—Recognizing the anxiety of American and British military government to get the occupation of Germany on a less costly basis by expanding German exports, German officials are fighting for better prices for the scrap that is going out of Germany to Britain. This action would also possibly affect the price levels of scrap that may come from Germany to the U. S. next year. German hopes of carrying out the scrap export program on a commercial basis will not be realized.

• **FREIGHT ABSORPTION**—After Jan. 1 Republic Steel Corp. will ship steel and wire products into the St. Louis area from Gadsden, Ala., these products will be sold on the Birmingham base point price instead of the Chicago base point price which was formerly used. The increased cost to the jobbers in the St. Louis area averages $6.66 per ton, as they must absorb the extra freight.

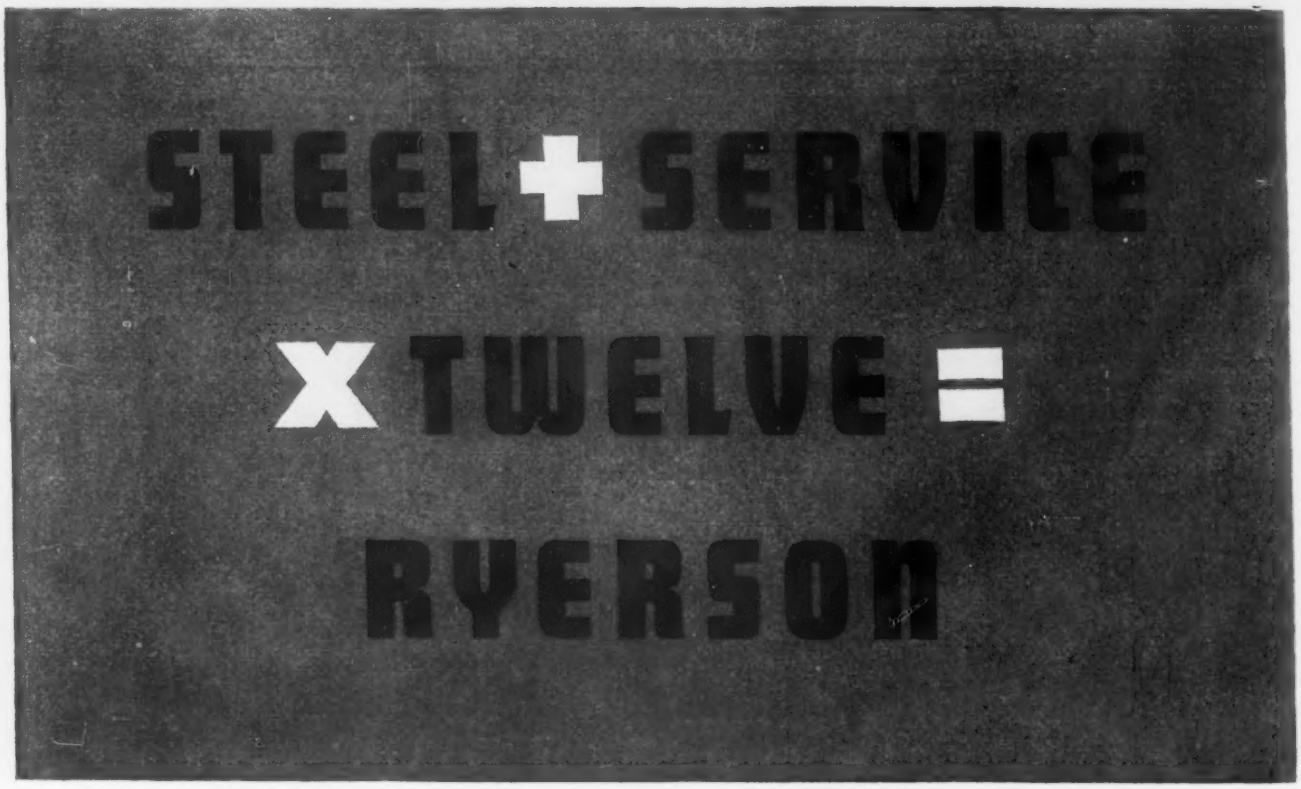
• **CUTTING DIRECT SALES**—Washington Steel Corp., producer of stainless steel strip in thin gages, is closing its direct sales offices. The company will continue to distribute through its regular warehouse channels.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
December 23	91.0	80.5	80.0*	93.5	90.0	99.0*	97.0	99.0	99.0*	114.0	100.0	90.0	96.5	88.0
December 30	104.0	94.5	83.0	93.5	95.5	102.0	97.5	100.0	101.0	117.0	100.0	89.5	108.0	97.0

* Revised.



Formula for nation-wide Steel-Service

Take a large and diversified stock of steel products. Add a complete, expertly trained service organization. Then multiply by twelve and you've got Ryerson—the answer to a multitude of steel problems.

The great twelve-plant Ryerson Steel-Service system is the dynamic result of more than a century of experience in the business of steel distribution. It's an organization built around the varied abilities of thousands of experienced steel men. And its sole purpose is to meet your steel requirements as accurately and as promptly as possible.

Restricted only by the shortages brought on by today's tremendous demand, Ryerson Steel-Service is always yours for the asking, whether your needs are measured in pounds or tons. So contact the nearest Ryerson plant for prompt personal service whenever you need steel and for full cooperation whenever you are faced with a steel problem.

Joseph T. Ryerson & Son, Inc. Steel-Service Plants at: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles.

RYERSON STEEL

President Calls for 2 Million Tons of Finished Steel

Washington

• • • **President Truman** has called upon Congress to provide money and goods, amounting to $6.8 billion in European aid for the first 15 months and $17 billion for the overall 4-year program. In his special message, he asked that a separate agency be set up to administer the program and that an administrator be sent to Europe to supervise overseas operations.

Under the White House proposal, during the first 15-month period—from Apr. 1, 1948 to June 30, 1949—the United States would be expected to provide as her share of the Marshall Plan:

Finished steel, 2 million tons, raw and semi-finished steel 935,000 tons, steelmaking equipment $48 million, agricultural machinery $136 million, coal mining machinery $82 million, and freight cars 20,000. Some 43 million metric tons of coal was also included.

Steel and related major requirements from the United States for the overall program would aggregate about 6,551,000 metric tons of finished steel, 3,121,000 tons of raw and semifinished steel, 79,000 tons pig iron (first 15 months), $192 million worth of steelmaking equipment, $545 million worth agricultural equipment, $206 million worth of mining machinery and 26,000 freight cars.

"No imports of scrap from the United States are provided in the executive branch estimates," the White House said, "because of the greater ton-for-ton reduction in crude steel production in the United States this would entail. In addition, any large-scale purchase of scrap for import into Europe . . . would boost the whole structure of steel costs and prices. For similar reasons, the estimates of imports (into Europe) of crude and semifinished steel are substantially reduced."

It is asked that the United States assume responsibility for approximately half (or $192 million) of the $400 million worth of steelmaking equipment needed for Europe's $2.5 billion steel expansion program. This would be provided in $48 million annual installments beginning next year. Already, the State Dept. says, the participating nations have about $80 million worth on order.

Raw Steel Requirement For 15 Months 935,000 Tons; 3 Million Total

o o o

This aid to the steel and machinery industry is expected by the end of 1951 to have rehabilitated the 16 participating nations (plus Western Germany) to the point where raw steel production will have been increased to 55 million tons or 20 pct above prewar, increased coal production to 584 million tons annually or 32 million above prewar, and, to have developed oil refining capacity to 2½ times prewar.

Because of urgent need for steel plant reconstruction, as well as transportation rehabilitation, the White House explains, greater than current shipments of steel sheet are asked for the 15-month period. It is added that the amounts requested are less than had been asked in the Paris report. The full amount requested in tinplate would be allowed by the White House.

Shipments of all other finished steel for 1948-49 is requested to be continued at the current rate which is at about 2½ times the amounts asked. This increase over the requests would help make up for part of the expected deficiencies in European production while the foreign plants are getting back into production.

However, requests for raw steel were trimmed substantially in face of the proposed increase of finished steel. The executive dept. took cognizance of the fact that shipment of any appreciable amounts of crude steel would not only reduce domestic production of finished steel but would deprive the American steel ind stry of the scrap generated in the finishing process. The White House was advised that this scrap would amount to about 15 pct of total weight and result in a corresponding decrease in raw steel output.

While Europe had requested more than 100,000 freight cars and the Harriman Committee had recommended 70,000, the President cut the number to 26,000. Some 20,000 would be shipped over the next 15 months and the remaining 6000 during the following year. Should a greater amount prove necessary eventually, no more than 20,000 would be provided in any 1 year.

The White House measure followed recommendations of the Harriman Committee by suggesting that the nations receiving aid, or their colonies, should ship to the United States materials for its stockpile in partial return for aid. These would be bought from the various nations with funds authorized under the stockpiling act.

While the President's bill made no direct reference to imposition of allocations, his message touched briefly on the matter as it related to the effect of European aid on domestic economy. These exports would have an important impact, he said, but "measures I have already proposed to the Congress to fight general domestic inflation will also be useful in cushioning the impact of European Aid Program."

The President's message proposed that administration of the program be placed in the hands of a new agency to be called the Economic Cooperation Administration, headed by a single administrator. The agency would be responsible for initiating the program, project by project and nation by nation, and for all policy matters.

However, existing agencies would handle administrative details under the President's program. Commerce, for example, would be responsible for the allocation of industrial materials and for continued administration of export controls.

Kaiser Makes Newest Approach to RFC In Fontana; Rebuff Due

New York

• • • **Following the steadfast** refusal of the Reconstruction Finance Corp. to scale down the wartime loan to Henry Kaiser for the construction of the steel mill at Fontana, Calif., Mr. Kaiser has submitted a counter-proposal for further loans from the RFC.

Mr. Kaiser has avowed publicly his interest in expanding the finishing facilities at Fontana, conditional upon the willingness of the government lending agency to reduce the $84 million loan by an odd $50 million or so. Following repeated rebuffs in Washington, Mr. Kaiser is now known to have proposed to the RFC that more government funds, say $100 million perhaps, be produced and Kaiser steel will use it to build the new finishing capacity needed at Fontana.

High officials in Washington state that this proposal is just another Kaiser technique to get the same end result. Kaiser's first idea was to spend his own money —or raise funds publicly for the expansion—after the first mortgage indebtedness to the government was substantially reduced. There are rumors that he has also considered some public financing as a part of the new proposal.

It is known that the RFC board will meet again in the early part of this month, and it is expected that Mr. Kaiser will get his official answer from the RFC by that time. The answer to the latest proposal is not calculated to please the west coast industrialist.

Sharon Steel Buys Domestic Coke Corp.

Sharon, Pa.

• • • **Sharon Steel Corp.** has bought the Domestic Coke Corp., Fairmont, W. Va. The plant, formerly owned by Standard Oil Co. of New Jersey, has 60 byproduct ovens with a monthly capacity of 25,000 tons. Included was a coal reserve of 15 million tons.

Coke supply to foundry customers of the Domestic Coke Corp. will be materially reduced in January, according to a Sharon spokesman. Eventually most of these companies will be obliged to find other coke sources. Thus they will be in the same position Sharon was in when it acquired the government-built coke plant at Morgantown, W. Va. However, they will have more time than Sharon did to find a new source of supply. Sharon took over from Du Pont, the wartime operator, and was planning to use its product in steelmaking. Then the government stepped in and on 24-hr notice directed Sharon to divert the entire supply to Hayden Chemical Co. The latter used it, under government directive, for fertilizer manufacture.

Dominion Foundries To Build Furnace

Toronto

• • • **Dominion Foundries** & Steel Ltd., Hamilton, is arranging with a United States company for the construction of a blast furnace and installation of a battery of coke ovens. The proposed blast furnace will have a rated capacity of 300 tons per day, and the new installations will represent an expenditure of approximately $15 million.

For some time past, under special arrangements, Dominion Foundries & Steel has been obtaining most of its pig iron from Dominion Steel & Coal Co., Sydney, N. S., thus the new blast furnace would provide iron for Dominion Foundries' own requirements and leave something over for the merchant markets. Earlier this year the company installed new equipment in its plant including soaking pits, mill tables, cleaning equipment, etc.

At present there are 14 blast furnaces in Canada with total rated capacity of 2,743,760 net tons per annum. Furnaces are located as follows: Algoma Steel Corp., Sault Ste. Marie, 5; Steel Co. of Canada Ltd., Hamilton, 3; Canadian Furnaces Co., Port Colborne, Ont., 2, and Dominion Steel & Coal Corp., Sydney, N. S., 4. Currently 11 stacks are blowing and three blown out, with production running approximately 72 pct of total rated capacity.

Pig Iron and Silvery Iron Producers Put Up Prices $2 to $3 a Ton

New York

• • • **Leading producers of** pig iron and silvery iron have announced price increases on their products and other producers are studying their costs and are expected to raise their prices during the week.

Pickands Mather and Co. has increased pig iron prices $2.00 a ton on all grades effective Dec. 29. Sloss Sheffield Steel and Iron Co. has announced a $3.00 increase on basic and No. 2 foundry iron at Birmingham effective Jan. 1. Youngstown Sheet and Tube Co. has announced a $2.00 price increase on all grades effective Dec. 29. Alan Wood Steel Co. raised all grades of iron at Swedeland, Pa., $4.00., effective Dec. 22. Price increases effective Jan. 1 are not reflected in price pages in this issue, as the price date for the issue is Dec. 30.

The Globe Iron Co. has announced a $2.00 price increase on blast furnace silvery iron at Jackson, Ohio, effective Jan. 1.

Last week Hanna Furnace Co. announced a $2.00 increase on silvery iron at Buffalo. Pittsburgh Metallurgical Co. is working on an increase on electric furnace silvery iron at Niagara Falls, N. Y., to go into effect Jan. 1.

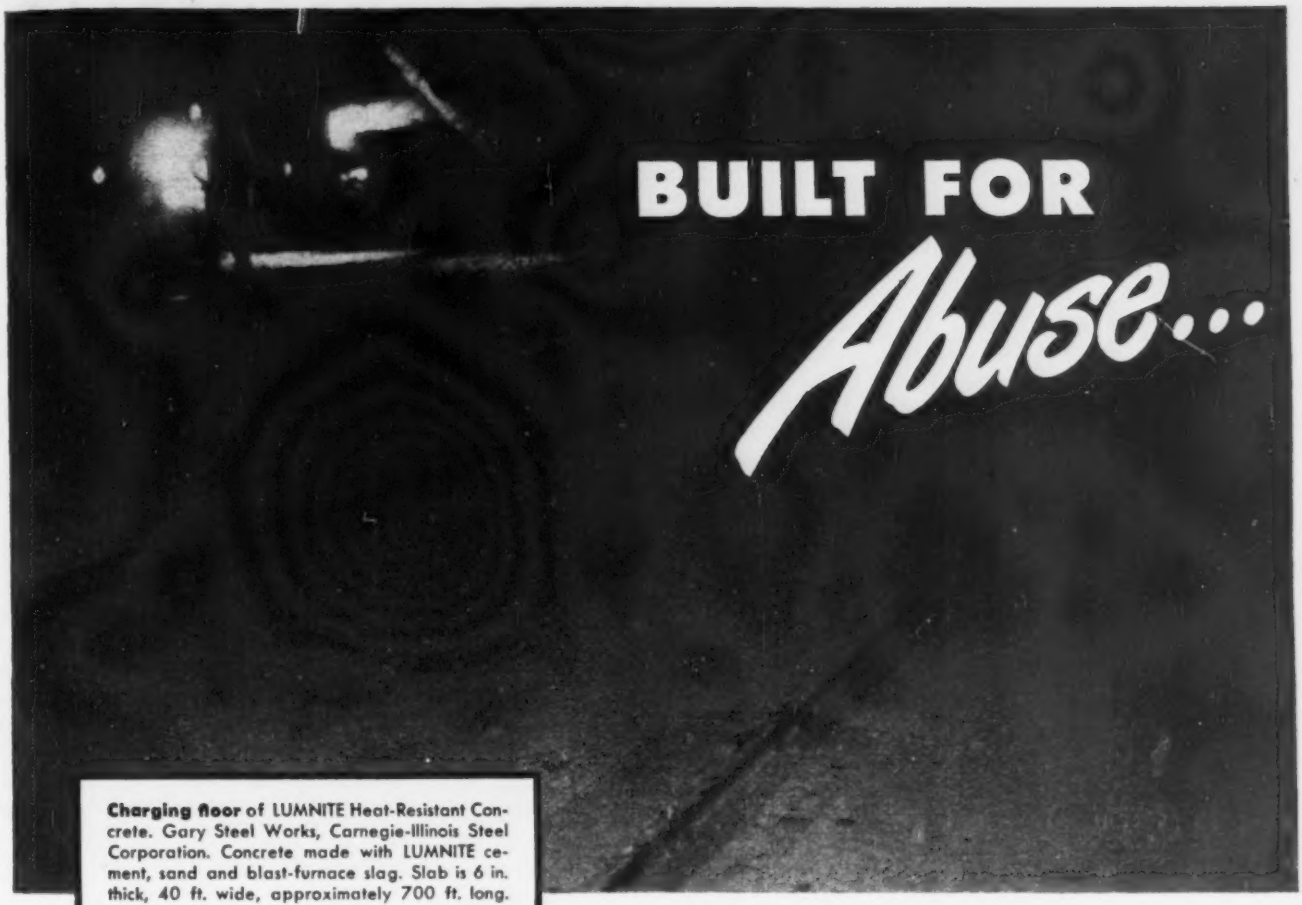
All Officers of ISIS At Boston Reelected

Washington

• • • **All officers** and members of the executive committee of the Boston chapter of the Institute of Scrap Iron & Steel, Inc., were reelected at a meeting of the chapter held recently.

Frank B. Gordon, Harcon Corp., Boston, was reelected president of the chapter.

Other officers reelected include: First vice-president, David Reisner, William Reisner & Co., Clinton, Mass.; second vice-president, Stanley Amidon, Charles Dreifus Co., Worcester; secretary, Nathaniel E. Slavin, N. E. Slavin & Co., Boston; treasurer, Sam Brier, Harcon Corp., Boston.



Charging floor of LUMNITE Heat-Resistant Concrete. Gary Steel Works, Carnegie-Illinois Steel Corporation. Concrete made with LUMNITE cement, sand and blast-furnace slag. Slab is 6 in. thick, 40 ft. wide, approximately 700 ft. long.

Open-hearth charging floor of LUMNITE concrete resists...

Scraping and Dragging • Metal Spillage
Continuous Heat • Banging and Vibration

A smooth, level, jointless floor makes it easy to shovel materials and handle tools. A concrete floor is ideal, provided it withstands heat from the furnaces, shaking by the charging machine, occasional spattering of metal—plus the constant wear and tear from charging boxes, ladles and scrap.

Heat-Resistant concrete made with LUMNITE cement meets these requirements. Heat, vibration and shock do not break down the concrete. The easy-to-sweep surface encourages good housekeeping. Safety, too, is increased by getting rid of ragged, foot-tripping pavements.

Old floors can be quickly replaced because rapid-hardening LUMNITE concrete is ready for service in 24 hours. Write for booklets giving full information on aggregates, mixes and methods of placing Heat-Resistant Concrete and Refractory Concrete.

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UNIVERSAL ATLAS CEMENT COMPANY
UNITED STATES STEEL CORPORATION SUBSIDIARY
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"THE THEATRE GUILD ON THE AIR"—*Sponsored by U.S. Steel—Sunday Evenings—ABC Network*

MACHINE TOOLS-NONFERROUS METALS

. . . News and Market Activities

Selling Campaigns Seen Featuring Another $300 Million Year

• • • **While neither** feast nor famine will prove the fate of the machine tool industry in the next 12 months, a look into the crystal ball suggests that 1948 should be another $300 million year, perhaps larger, considering the current price increases.

Reports percolating through the trade indicate that the first quarter ought to be pretty good, marking a continuation of the spotty but reasonably plentiful spread of new firm orders which finished up 1947. Trade dope also has it that the second half will be better than the first, but whether this be bear or bull will come out in the year-end wash.

It seems likely that some companies will continue to do very well, people, for the most part, who had something new and tangible in the way of cost cutting equipment to show at Chicago last September. Other companies did not do very well in 1947, and probably will not do very well in 1948, barring the introduction of new models. But the number of companies in the industry doing well probably exceed the number who are not.

Machine tool builders are about set on an aggressive, big scale selling campaign, taking into account a number of so-called plus-factors, including rising costs, resulting from higher priced raw materials and manpower. At the same time, machine tool prices are going up about 10 pct, which is neither the way out of the present situation for the industry, nor a help to the sales campaign.

Oddly enough, 1947 got under way as 10 pct price increases were being made right and left, and was expected to be a lean and hungry year. Costs of basic materials and components provided the background for the increase, a circumstance which is repeating itself at the present time.

The industry is starting off on a new year unhampered by many of the component bottlenecks which held up shipments many times last year. Special motors are still hard to get, but this situation is improving steadily. Only major raw material problem affecting the industry at the moment is pig iron, which is in acutely short supply and likely to remain so for most of this year. A number of furnace relining programs are scheduled for the next several months, which will accentuate the shortage of foundry iron.

•

Copper

• • • **Major copper** producers have sold out their production for January and will not open up their books for February until after Jan. 1. They are holding their domestic and export price firm at 21.50¢. Other factors are reported to be selling relatively small tonnages as high as 21.75¢ f.a.s. New York. It is understood that some of this tonnage is sold on the East Coast and supplements West Coast sales with added freight difference. Producers are anxiously watching this development as the movement might be responsible for a higher domestic copper price if the tonnage sold at a higher price were to grow. Producers have been unable to take care of January requirements of brass mills in full. Wire mill consumption is still going strong. The copper trade is concerned by the probable method of distributing copper and brass products under the Marshall Plan. According to current thought there are two possible mechanisms: Private purchases by foreign nations subject to the control tonnages of the plan; or U. S. Treasury purchase for Marshall Plan account. Producers point out that the latter course would be tantamount to allocation of copper by the Treasury and subject to the objections of any allocations program.

•

Tin Bearing Scrap Up

New York

• • • **Scrap dealers report that** smelters have increased prices for tin bearing grades of scrap to correspond with the 14¢ increase in the price of tin. Block tin is up 10¢ per lb to a range of 73¢ to 75¢. Pewter, auto babbitt and siphon tops are up 5¢ a lb; solder joints are up 2¢. Smelters are reported to have decreased the smelting charge on lead scrap, raising soft lead scrap to a range of 11¼¢ to 11¾¢; dry battery plates to 6½¢ to 7¢.

•

Raise Price of Beryllium

Reading, Pa.

• • • **The Beryllium Corp.** has announced a price for its beryllium copper master alloy of $40.00 per lb of contained beryllium, an increase of $4.50 above its former price. Recently the company announced an increase of $3.50 in its beryllium copper master alloy to a price of $20.50 per lb of contained beryllium. These price increases have been made necessary, officials say, by the higher costs of ore and labor. The company also markets a master alloy of 5 pct beryllium, 5 pct magnesium and the balance aluminum at a price of $34.50 per lb of contained beryllium.

Nonferrous Metals Prices

Cents per pound

	Dec. 24	Dec. 26	Dec. 27	Dec. 29	Dec. 30
Copper, electro, Conn.	21.50	21.50	21.50	21.50	21.50
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York	94.00	94.00	94.00	94.00	94.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50	10.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80

SCRAP

. . . News and Market Activities

Holiday and Snow Quell Market

New York

• • • **The holiday period** settled its usual calm down over the market, and some estimates were that the total business volume fell off to 25 pct of normal. Despite some expectations that there would be large scale mill purchases of heavy melting steel before the end of the year, mills managed to continue to stay out of the market up to midweek.

Heavy snowfalls in the eastern markets stymied activity in the area and shipments out of the district as well. All of this action pointed toward a period of price testing early in the new year. Brokers in some important areas show little confidence in the validity of existing quotations, and state that they are not interested in any large orders at this time.

The general feeling in the market is that the new year will see no noteworthy easing in scrap supplies. Despite the general lack of activity in heavy steelmaking scrap grades there is a pronounced scarcity of this material. There is little hope of anything happening in the coming year to substantially weaken the market.

The cast and specialty markets have continued their upward trend, and selected grades of foundry material bring almost any price that the seller chooses to ask. Most cast iron scrap is now falling into a single general category, and is moving pricewise simultaneously.

•

PITTSBURGH — Lack of openhearth steel scrap sales still dominated market activity early this week. Though some had predicted purchases this week it appears that heavy snows in other districts if nothing else have further stymied activity. Mills still hold to their $40 formula price but those on the selling end are not sure that it will hold for long. Proof of this is in brokers statements that they are uninterested in any large orders at this time. Touch and go is the word for the openhearth market, as the trade is waiting to see if dealers will ship on $40 orders while the dealers are anxious to see if any mill will step out of line on price. The cold snap has apparently cut down the size of rail lists if the latest offering is any indication. Heavy weather usually forces roads to put more crews on clearing and maintenance work with less manpower for scrapping.

•

CHICAGO — Brokers' buying prices moved up last week. Reported sales ranged from $40.50 to $41.50 and many observers doubt that these purchases are strictly speculation. Dealers are starting to again think about selling in large tonnages. This group seems to consider $42 as a fair price despite the mills' insistence that $39 should be maintained. On the basis of what is moving, and disregarding tie-in or earmarked sales, the market last week showed $40 delivered as a fair representative delivered price. Remote is still coming in but as yet the volume has not been heavy.

•

PHILADELPHIA — Activity was at a low ebb in this market last week and some observers estimate that shipments dropped during the week to 25 pct of normal. The eastern snowstorm is expected to reduce scrap flow out of New York, New Jersey and New England. Yard operations here have been retarded by thawing followed by freezing. Dealers are reported to be unconcerned over the resistance of mills to higher scrap prices than those quoted. The cast market is very strong.

•

CLEVELAND—With the holidays at an end, the search for a whipping boy will begin in earnest. Inventories are dwindling and very little material other than the earmarked variety is moving to major consumers, some of whom are known to have less than two weeks' supply on hand. With the worst period just ahead, January and February, some consumers at least are going to be in for a rough time. The market is full of rumors of higher prices being paid for remote material and it is likely that some higher priced orders will soon be on their way.

•

DETROIT—Steel scrap prices are holding at "formula" levels pending a showdown within the next two weeks. Foundry grades continue to fly into the stratosphere. This week sales have been reported at as high as $65 per gross ton on a broker's buying basis, and the end is not yet in sight according to most sources. Undoubtedly the continuing acute shortage of pig iron has added appreciably to the pressure that is accumulating under the prices of cast foundry grades. Some sources report that foundry scrap grading requirements have all but vanished in the scramble to get scrap at any price.

NEW YORK — The heavy snowfall has effectively paralyzed what scrap shipments might have been expected during the holiday period. One yard reports that it is out of the scrap business and into the snow removal field. It states that midweek removal from its own establishment was running 1000 tons per day. There were reports of still stronger cast activity, but the volume was small.

•

BOSTON — Although the market is quiet a few sales serve to keep interest alive. Several carlots of regular open hearth heavy steel for Pittsburgh delivery sold at $32, f.o.b. A small tonnage of specially prepared foundry steel, cut 2 ft and shorter, sold at $37, and a single carlot of No. 2 regular heavy melting at $33. In addition, cast is moving in small lots, truck delivery, at top 1947 prices. Brokers generally now offer $31.40 for heavy melting steel.

•

BUFFALO—Although resistance to the recent sharp advances in cast grades were reported, some foundries told dealers they would suspend operations rather than chase the current thin market. The general undertone, however, remained strong in spite of the continued stalemate in openhearth grades. The first major test of the price formula is expected this month. Observers with nothing at stake asserted the outcome was anybody's guess. Efforts to bring specialties in line with the $39.25 price for steelmaking scrap have had no noticeable effect so far.

•

ST. LOUIS — The usual holiday quiet continues in the scrap iron market with prices of all grades unchanged. Shipments have been light and mills have been cutting into their inventories.

•

BIRMINGHAM — Holiday inactivity marks the scrap business in this district. Nobody is trading and nobody wants to talk business until the Christmas holidays are over. Prices are unchanged.

•

TORONTO — Business in the Canadian scrap markets was almost at a standstill for the past week as a result of the long Christmas holiday and local dealers do not look for much improvement before the beginning of 1948. Receipts of scrap iron and steel were negligible, with only small lots reported from industrial plants and nothing from outside points. Dealers and consumers are not very optimistic regarding scrap supply throughout the winter months insofar as domestic sources are concerned, but there is still hope that imports will be sufficient to fill in the gap and enable steel mills to maintain present high production schedules. Foundries, however, still face a critical shortage of scrap iron with no indications of early improvement. The Canadian scrap situation as a whole is serious.

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.00
RR. hvy. melting	$40.50 to 41.00
No. 2 hvy. melting	40.00
RR. scrap rails	49.00 to 50.00
Rails 2 ft. and under	54.00 to 55.00
No. 1 comp'd bundles	40.00
Hand bdld. new shts.	40.00
Hvy. axle turn.	41.50 to 42.00
Hvy. steel forge turn.	41.50 to 42.00
Mach. shop turn.	35.00 to 35.50
Shoveling turn.	36.50 to 37.00
Mixed bor. and turn.	35.00 to 35.50
Cast iron borings	35.50 to 36.00
No. 1 cupola cast.	54.00 to 55.00
Hvy. breakable cast.	41.50 to 42.50
Malleable	60.00 to 61.00
RR. knuck, and coup.	52.50 to 53.50
RR. coil springs	52.50 to 53.50
RR. leaf springs	52.50 to 53.50
Rolled steel wheels	52.50 to 53.50
Low phos.	47.00 to 48.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 bundles	39.00 to 40.00
No. 2 dealers' bundles	39.00 to 40.00
Bundled mach. shop turn.	39.00 to 40.00
Galv. bundles	37.00 to 38.00
Mach. shop turn.	34.00 to 35.00
Short shov. turn.	36.00 to 37.00
Cast iron borings	35.00 to 36.00
Mix. borings & turn.	34.00 to 35.00
Low phos, hvy. forge	47.00 to 48.00
Low phos, plates	44.00 to 45.00
No. 1 R.R. hvy. melt.	46.00 to 47.00
Rerolling rails	60.00 to 61.00
Miscellaneous rails	54.00 to 55.00
Angles & splice bars	55.00 to 56.00
Locomotive tires, cut	55.00 to 56.00
Cut bolster & side frames	54.00 to 54.50
Standard stl. car axles	60.00 to 61.00
No. 3 steel wheels	51.50 to 52.00
Couplers & Knuckles	52.00 to 52.50
Rails 2 ft. and under	60.00 to 62.00
Malleable	71.00 to 73.00
No. 1 mach. cast.	62.00 to 65.00
No. 1 agricul. cast.	60.00 to 61.00
Hvy. breakable cast.	45.00 to 48.00
RR. grate bars	52.00 to 53.00
Cast iron brake shoes	52.00 to 53.00
Cast iron carwheels	49.00 to 50.00

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$38.00 to $40.00
No. 2 hvy. melting	38.00 to 40.00
No. 1 bundles	38.00 to 40.00
No. 2 bundles	38.00 to 40.00
Mach. shop turn.	33.00 to 34.00
Shoveling turn.	33.00 to 34.00
Cast iron borings	30.00 to 31.00
Mixed bor. & turn.	30.00 to 31.00
Low phos. plate	49.00 to 50.00
No. 1 cupola cast.	53.00 to 55.00
Hvy. breakable cast.	42.00 to 43.00
Scrap rails	49.00 to 50.00

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 hvy. melting	$33.00 to $35.00
No. 2 hvy. melting	31.40 to 32.00
Nos. 1 and 2 bundles	33.00 to 33.50
Busheling	33.00 to 33.50
Shoveling turn.	30.00 to 30.50
Machine shop turn.	28.00 to 28.50
Mixed bor. & turn.	28.00 to 28.50
Cl'n cast. chem. bor.	33.00 to 34.00
No. 1 machinery cast.	44.00 to 45.00
No. 2 machinery cast.	44.00 to 45.00
Heavy breakable cast.	40.00 to 41.00
Stove plate	39.00 to 40.00

DETROIT

Per gross ton, brokers' buying prices, f.o.b. cars:

No. 1 hvy. melting	$34.75 to $35.25
No. 2 hvy. melting	34.75 to 35.25
No. 1 bundles	34.75 to 35.25
New busheling	34.75 to 35.25
Flashings	34.75 to 35.25
Mach. shop turn.	28.50 to 29.00
Shoveling turn.	29.50 to 30.00
Cast iron borings	29.50 to 30.00
Mixed bor. & turn.	29.50 to 30.00
Low phos. plate	39.75 to 40.25
No. 1 cupola cast.	58.00 to 63.00
Heavy breakable cast.	46.00 to 51.00
Stove plate	46.00 to 51.00
Automotive cast.	58.00 to 63.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	40.00 to 41.00
Mach. shop turn.	33.50 to 34.50
Shoveling turn.	35.00 to 36.00
Mixed bor. & turn.	33.50 to 34.50
Clean cast chemical bor.	39.00 to 41.00
No. 1 machinery cast.	55.00 to 56.00
No. 1 mixed yard cast.	50.00 to 54.00
Hvy. breakable cast.	50.00 to 52.00
Clean auto cast.	55.00 to 56.00
Hvy. axle forge turn.	42.50 to 43.50
Low phos. plate	46.50 to 47.50
Low phos. punchings	46.50 to 47.50
Low phos. bundles	45.50 to 46.50
RR. steel wheels	50.00 to 51.00
RR. coil springs	50.00 to 51.00
RR. malleable	65.00 to 70.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.50 to $41.00
No. 2 hvy. melting	38.00 to 39.00
Bundled sheets	38.00 to 39.00
Mach. shop turn.	32.00 to 33.00
Locomotive tires, uncut	46.00 to 47.00
Mis. std. sec. rails	52.00 to 53.00
Rerolling rails	57.00 to 58.00
Steel angle bars	53.00 to 54.00
Rails 3 ft. and under	56.00 to 58.00
RR. steel Springs	49.00 to 50.00
Steel car axles	51.00 to 52.00
Grate bars	50.00 to 51.00
Brake shoes	52.00 to 53.00
Malleable	66.00 to 68.00
Cast iron car wheels	51.00 to 52.00
No. 1 machinery cast.	56.00 to 57.00
Hvy. breakable cast.	48.00 to 49.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	37.00 to 38.00
No. 2 bundles	37.00 to 38.00
No. 1 busheling	37.00 to 38.00
Long turnings	23.00 to 24.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	24.00 to 25.00
Bar crops and plate	38.00 to 38.50
Structural and plate	38.00 to 38.50
No. 1 cupola cast.	55.00 to 57.50
Stove plate	48.00 to 50.00
No. 1 RR. hvy. melt.	36.00 to 37.00
Steel axles	38.00 to 39.00
Scrap rails	37.50 to 38.00
Rerolling rails	52.00 to 54.00
Angles & splice bars	40.00 to 41.00
Rails 3 ft. & under	40.00 to 41.00
Cast iron carwheels	47.00 to 48.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.50 to $40.00
No. 2 hvy. melting	39.50 to 40.00
Mach. shop turn.	34.50 to 35.00
Short shov. turn.	36.50 to 37.00
Cast iron borings	35.50 to 36.00
Low phos	47.00 to 47.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	35.00 to 36.00
No. 2 bundles	35.00 to 36.00
Comp. galv. bundles	32.00 to 33.00
Mach. shop turn.	30.00 to 31.00
Mixed bor. & turn.	30.00 to 31.00
Shoveling turn.	30.00 to 31.00
No. 1 cupola cast.	46.00 to 47.00
Hvy. breakable cast.	46.00 to 47.00
Charging box cast.	46.00 to 47.00
Stove plate	46.00 to 47.00
Clean auto cast.	46.00 to 47.00
Unstrip. motor blks.	43.50 to 44.00
Cl'n chem. cast bor.	33.50 to 34.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 bundles	39.00 to 40.00
No. 2 bundles	39.00 to 40.00
No. 1 busheling	39.00 to 40.00
Mach. shop turn.	32.50 to 33.50
Shoveling turn.	34.50 to 35.50
Cast iron borings	31.50 to 32.50
Mixed bor. & turn.	31.50 to 32.50
Mixed cupola cast.	53.00 to 55.00
Charging box cast.	48.00 to 50.00
Stove plate	52.00 to 54.00
Clean auto cast.	58.00 to 60.00
RR. Malleable	70.00 to 72.00
Small indl. malleable	47.00 to 49.00
Low phos. plate	46.00 to 49.00
Scrap rails	49.00 to 50.00
Rails 3 ft. & under	52.00 to 54.00
RR. steel wheels	48.00 to 50.00
Cast iron carwheels	48.00 to 50.00
RR. coil & leaf spgs.	48.00 to 50.00
RR. knuckles & coup.	48.00 to 50.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.00 to $39.50
No. 2 hvy. melting	39.00 to 39.50
No. 1 bundles	39.00 to 39.50
No. 1 busheling	39.00 to 39.50
Drop forge flashings	39.00 to 39.50
Mach. shop turn.	34.00 to 34.50
Shoveling turn.	36.00 to 36.50
Steel axle turn.	39.00 to 39.50
Cast iron borings	35.00 to 35.50
Mixed bor. & turn.	34.00 to 34.50
Low phos.	44.00 to 44.50
No. 1 machinery cast.	56.00 to 60.00
Malleable	68.00 to 70.00
RR. cast.	58.00 to 60.00
Railroad grate bars	50.00 to 52.00
Stove plate	52.00 to 54.00
RR. hvy. melting	40.00 to 40.50
Rails 3 ft. & under	58.00 to 60.00
Rails 18 in. & under	59.00 to 61.00

SAN FRANCISCO

Per gross ton f.o.b. shipping point:

No. 1 hvy. melting	$25.00
No. 2 hvy. melting	25.00
No. 2 bales	25.00

Per gross ton delivered to consumer:

No. 3 bales	$19.50
Mach. shop turn.	16.00
Elec. furn. 1 ft. und	$32.00 to 34.00
No. 1 cupola cast.	32.00 to 33.00
RR. hvy. melting	26.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$25.50
No. 2 hvy. melting	25.50
No. 1 bales	25.50
No. 2 bales	25.50
No. 3 bales	19.50
Mach. shop turn.	17.50
No. 1 cupola cast.	$36.00 to 40.00
RR. hvy. melting	26.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	$24.00 to $26.50
Elec. furn. 1 ft. and und.	27.50 to 30.00
No. 1 cupola cast.	27.50
RR. hvy. melting	25.00 to 26.00

HAMILTON, ONT.

Per gross ton delivered to consumer:
Cast grades f.o.b. shipping point

Heavy melting	$23.00*
No. 1 bundles	22.00*
No. 2 bundles	21.50*
Mechanical bundles	20.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushelings	17.00*
Bushelings, new fact., prep'd	21.00*
Bushelings, new fact., unprep'd	16.00*
Short steel turnings	17.00*
No. 1 cast.	$6.00 to 40.00

*Ceiling Price.

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point, freight allowed	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American Laredo Tex.	33.00
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be.	$20.50
Beryllium aluminum 5% Be, dollars per lb contained Be.	$40.00
Cadmium, del'd	$1.75
Cobalt, 97-99% (per lb)	$1.65 to $1.72
Copper electro, Conn. Valley	21.50
Copper, lake, Conn. Valley	21.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$80 to $90
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$80 to $82
Nickel, electro, f.o.b. New York	37.67
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$66 to $69
Silver, New York, cents per oz.	74.625
Tin, Grade A, New York	94.00
Zinc, East St. Louis	10.50
Zinc, New York	11.06
Zirconium copper, 6 pct Zr. per lb contained Zr.	$8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot	
No. 115	18.50-19.00
No. 120	18.00-18.50
No. 123	17.50-18.00
80-10-10 ingot	
No. 305	23.50-24.00
No. 315	21.00-21.50
88-10-2 ingot	
No. 210	30.00-30.50
No. 215	28.00-28.50
No. 245	22.75-23.25
Yellow ingot	
No. 405	14.50-15.50
Maganese Bronze	
No. 421	18.00-18.50

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys:	
0.30 copper, max.	16.00-16.75
0.60 copper, max.	15.50-16.25
Piston alloys (No. 122 type)	15.50-16.00
No. 12 alum. (No. 2 grade)	15.25-15.75
108 alloy	15.50-16.00
195 alloy	15.50-16.50
AXS-679	15.75-16.25
Steel deoxidizing aluminum, notch-bar, granulated or shot	
Grade 1—95 pct-95½ pct	15.25-16.00
Grade 2—92 pct-95 pct	14.00-15.00
Grade 3—90 pct-92 pct	13.50-14.50
Grade 4—85 pct-90 pct	13.25-14.00

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	37⅝
Electrodeposited	32.34
Rolled, oval, straight, delivered	32.59
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	33⅜
Zinc, cast, 99.99	18¾
Nickel, 99 pct plus, frt allowed	
Cast	51
Rolled, depolarized	53
Silver 999 fine	
Rolled, 1000 oz. lots, per troy oz.	67¼

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	44.50
Copper sulfate, 99.5, crystals, bbls	11.50
Nickel salts, single, 425 lb bbls, frt allowed	14.50
Silver cyanide, 100 oz. lots, per oz.	54.00
Sodium cyanide, 96 pct, domestic, 200 lb. drums	16.00
Zinc cyanide, 100 lb drums	35.50
Zinc sulfate, 89 pct, granules, bbls, frt allowed	7.75

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall; 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier; 2S, 3S, 21.2¢; 52S, 24.2¢ 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75-S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness; 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1 in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam. rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18; 2S, 3S, 33.5¢; 56S, 39.5¢ 10,000 lb base. B & S gage 00-1; 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16; 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb f.o.b. mill. Base quantity 30,000 lb.)

Sheet and Plate: Ma. FSa. ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 14, 69¢-74¢; 16, 79¢-81¢; 18, 87¢-89¢; 22, $1.25-$1.31; 24, $1.71-$1.75.

Round Rod: M, diam, in., ¼ to ⅜, 47¢; ½ to ¾, 45¢ 1¼ to 2½, 43.5¢; 3½ to 5, 42.5¢. Other alloys higher.

Square, Hexagonal Bar: M, size across flats, in., ¼ to ⅜, 52.5¢; ½ to ¾, 47.5¢; 1¼ to 2½, 45¢; 3½ to 5, 44¢. Other alloys higher.

Solid Shapes, Rectangles: M, form factors, 1 to 4, 46¢; 11 to 18, 49¢; 20 to 22, 51.5¢; 29 to 31, 59.5¢; 38 to 40, 75.5¢; 47 to 49, 98¢. Other alloys higher.

Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ⅛ to 5/16, $1.21; 5/16 to ⅜, 31.12; ⅜ to 7/16, 97¢; 0.058 to 0.064, 7/16 to ½, 89¢; ½ to ⅝, 81¢; 0.065 to 0.082, ⅝ to ¾, 76¢; ¾ to 1, 72¢; 0.083 to 0.108, 1 to 2, 68¢; 0.165 to 0.219, 2 to 3, 59¢; 3 to 4, 57¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets	..	41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks	..	31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, l.c.l.	15.50
Ribbon, ton lots	14.50
Plates	
Small	13.50
Large, over 12 in.	14.50

Copper, Brass, Bronze

Cents per pound, freight prepaid on 200 lb.

	Extruded Shapes	Rods	Sheets
Copper	33.53	....	33.68
Copper, hot-rolled	....	30.03	....
Copper, drawn	....	31.03	....
Low brass	34.04*	31.07	31.38
Yellow brass	32.39*	29.32	29.63
Red brass	34.65*	31.68	41.99
Naval brass	29.56	28.31	34.25
Leaded brass	27.98	24.39	30.13
Commercial bronze	35.52*	32.80	33.11
Manganese bronze	33.14	31.64	37.75
Phosphor bronze, 5 pct.	53.25*	52.25	52.60
Muntz metal	29.17	27.92	32.36
Everdur, Herculoy, Olympic, etc.	37.07	35.57	38.44
Nickel silver, 5 pct.	41.20	40.28	38.67
Architectural bronze	27.94	....	....

*Seamless tubing.

Scrap Metals

Brass Mill Scrap

(Lots of less than 15,000 lb.)

Yellow brass rod turnings	14¼¢
Leaded yellow brass turnings	14¼¢
Loose yellow brass trimmings	15¼¢

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Copper and Brass

No. 1 heavy copper and wire	16½—17
No. 2 heavy copper and wire	15½—16
Light copper	14 —14½
Auto radiators (unsweated)	9¼— 9¾
No. 1 composition	12 —12½
No. 1 composition turnings	11½—12
Clean red car boxes	10 —10½
Cocks and faucets	9¾—10¼
Mixed heavy yellow brass	7½— 8
Old rolled brass	8 — 8½
Brass pipe	8⅝— 9¼
New soft brass clippings	11½—12
Brass rod ends	9 — 9½
No. 1 brass rod turnings	9 — 9½

Aluminum

Alum. pistons with struts	4½— 5
Aluminum crankcases	6 — 6½
2S aluminum clippings	9 — 9½
Old sheet & Utensils	6 — 6½
Mixed borings and turnings	— 2
Misc. cast aluminum	5½— 6
Dural clips (24S)	5 — 5½

Zinc

New zinc clippings	6 — 6½
Old zinc	4½— 5
Zinc routings	2½— 3
Old die cast scrap	2½— 3

Nickel and Monel

Pure nickel clippings	15½—17½
Clean nickel turnings	14 —15
Nickel anodes	16 —17
Nickel rod ends	16 —17
New Monel clippings	12 —13
Clean Monel turnings	7 — 8
Old sheet Monel	10 —10½
Old Monel castings	7½— 8
Inconel clippings	8 — 8½
Nickel silver clippings, mixed	7½— 8
Nickel silver turnings, mixed	5½— 6

Lead

Soft scrap lead	11¼—11¾
Battery plates (dry)	6½— 7

Magnesium Alloys

Segregated solids	6½— 7
Castings	4½— 5½

Miscellaneous

Block tin	73 —75
No. 1 pewter	53 —55
No. 1 auto babbitt	43 —45
Mixed common babbitt	11½—12
Solder joints	16½—17
Siphon tops	43 —45
Small foundry type	13 —13½
Monotype	12 —12½
Lino and stereotype	11½—12
Electrotype	10 —10½
New type shell cuttings	11 —11½
Clean hand picked type shells	4½— 5
Lino and stereo dross	5 — 5½
Electro dross	3¼— 3½

Lead Products

(Cents per lb)

F.o.b. shipping point freight collect Freight equalized with nearest free delivery point.

Full lead sheets	18.25
Cut lead sheets	18.75
Lead pipe, manufacturing point	17.50
Lead traps and bends	List +42%
Combination lead and iron bends and ferrules, also combination lead and iron ferrules	List +42%
Lead wool	19.50

Comparison of Prices . .

Advances over past week in **Heavy Type**, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

	Dec. 30, 1947	Dec. 23, 1947	Dec. 2, 1947	Dec. 31, 1946
Flat-rolled Steel: (cents per pound)				
Hot-rolled sheets	2.80	2.80	2.80	2.50
Cold-rolled sheets	3.55	3.55	3.55	3.20
Galvanized sheets (10 ga.)	3.95	3.95	3.95	3.55
Hot-rolled strip	2.80	2.80	2.80	2.50
Cold-rolled strip	3.55	3.55	3.55	3.20
Plates	2.95	2.95	2.95	2.50
Plates wrought iron	6.85	6.85	6.85	5.95
Stain's c-r strip (No. 302) *24 gage	30.50	30.50	30.50	30.30
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes.	$5.75	$5.75	$5.75	$5.00
Tinplate, electro (0.50 lb)	5.05	5.05	5.05	4.50
Special coated mfg. ternes	4.90	4.90	4.90	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.90	2.90	2.90	2.60
Cold-finished bars	3.55	3.55	3.55	3.20
Alloy bars	3.30	3.30	3.30	3.05
Structural shapes	2.80	2.80	2.80	2.35
Stainless bars (No. 302)	26.00	26.00	26.00	25.97
Wrought iron bars	7.15	7.15	7.15	6.15
Wire and Wire Products: (cents per pound)				
Bright wire	3.55	3.55	3.55	3.30
Wire nails	4.25	4.25	4.25	3.75
Rails: (dollars per 100 lb)				
Heavy rails	$2.75	$2.75	$2.75	$2.50
Light rails	3.10	3.10	3.10	2.85
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$45.00	$45.00	$45.00	$39.00
Sheet bars	66.00	66.00	66.00	38.00
Slabs, rerolling	45.00	45.00	45.00	39.00
Forging Billets	55.00	55.00	55.00	47.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	61.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.80	2.80	2.80	2.55
Skelp	2.60	2.60	2.60	2.05

	Dec. 30, 1947	Dec. 23, 1947	Dec. 2, 1947	Dec. 31, 1946
Pig Iron: (per gross ton)				
No. 2, foundry, Phila.	$42.98	$42.98	$40.97	$32.43
No. 2, Valley furnace	38.50	36.50	36.50	30.50
No. 2, Southern Cin'ti	40.24	40.24	40.24	29.80
No. 2, Birmingham	34.88	34.88	34.88	26.88
No. 2, foundry, Chicago†	36.00	36.00	36.00	30.50
Basic del'd Philadelphia	42.48	42.48	40.47	31.93
Basic, Valley furnace	38.00	36.00	36.00	30.00
Malleable, Chicago†	36.50	36.50	36.50	30.50
Malleable, Valley	36.50	36.50	36.50	30.50
Charcoal, Chicago	56.04	56.04	56.04	42.99
Ferromanganese‡	145.00	145.00	145.00	135.00
Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$40.00	$40.00	$40.00	$32.25
Heavy melt'g steel, Phila.	40.50	40.50	42.00	31.00
Heavy melt'g steel, Ch'go	39.50	38.75	38.75	30.25
No. 1, hy. comp. sheet, Det.	35.00	35.00	34.75	27.75
Low phos. Young'n	47.25	47.25	47.25	34.25
No. 1, cast, Pittsburgh	54.50	54.50	53.50	37.50
No. 1, cast, Philadelphia	55.50	55.50	53.50	41.50
No. 1, cast, Chicago	63.50	63.50	52.50	44.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$12.50	$12.50	$12.50	$8.75
Foundry coke, prompt	14.00	14.00	14.00	8.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	21.50	21.50	21.50	19.50
Copper, Lake, Conn.	21.625	21.625	21.625	19.625
Tin, Grade A, New York	94.00	94.00	80.00	70.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50
Lead, St. Louis	14.80	14.80	14.80	12.35
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	37.67	37.67	37.67	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	28.25

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ For carlots at seaboard.

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Dec. 30, 1947	3.18925¢ per lb.	$38.39 per gross ton	$40.00 per gross ton
One week ago	3.18925¢ per lb.	$37.39 per gross ton	$39.75 per gross ton
One month ago	3.18925¢ per lb.	$37.06 per gross ton	$40.25 per gross ton
One year ago	2.83599¢ per lb.	$30.14 per gross ton	$31.17 per gross ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1947	3.18925¢ Aug. 12	2.87118¢ Jan. 7	$38.39 Dec. 30	$30.14 Jan. 7	$42.58 Oct. 28	$29.50 May 20
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1941	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1940	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1939	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1938	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1937	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1936	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1935	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1934	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1933	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1932	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1931	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1930	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1929	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb & over. (9) Carload lot in manufacturing trade. (10) Delivered Los Angeles only. (12) Produced to dimensional tolerances in AISI Manual Sec. 6. (13) Delivered San Francisco only: includes 3 pct freight tax. (14) Kaiser Co. prices (15) to 0.035 to 0.075 in. thick by ¾ to 3½ in. wide. (17) Delivered Los Angeles: add ½¢ per 100 lb for San Francisco. (18) Slab prices subject to negotiation in most cases. Some producers charge (19) $2 more, (21) $1 more. Some producers charge (22) 0.05¢ less, (23) 0.10¢ less, (24) 0.20¢ less.

Basing Points	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		San Franc'co, Los Angeles, Seattle	DELIVERED TO Detroit	New York	Philadelphia
INGOTS															
Carbon, rerolling	($36.00 f. o. b. mill) (Spot market as high as $98 to $90 gross ton)														
Carbon, forging	$48.00														
Alloy	$58.00									(Canton = $56.00)					
BILLETS, BLOOMS, SLABS															
Carbon, rerolling [18]	$45.00[19]	$45.00[19]	$45.00[19]	$47.00	$45.00[19]	$45.00[19]							$48.00[19]		
Carbon, forging billets	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00							$58.00		
Alloy	$66.00	$66.00				$66.00	(Bethlehem, Massillon, Canton = $66.00)						$69.00		
SHEET BARS							Subject to negotiation								
PIPE SKELP	2.60¢[21]						2.60¢[21]								
WIRE RODS	2.80¢[21]	2.80¢[21]		2.80¢[21]	2.85¢		(Worcester = 2.90¢[21])					3.52¢[13]			
SHEETS															
Hot-rolled	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢		(Ashland, Ky. = 2.80¢)		3.51[17]¢	2.95¢	3.12¢	3.02¢
Cold-rolled[1]	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢	3.55¢		3.65¢	3.55¢			3.70¢	4.00¢	3.97¢
Galvanized (10 gage)	3.95¢[23]	3.95¢[23]	3.95¢[23]		3.95¢[23]		3.95¢	3.95¢	4.05¢	3.95¢	(Ashland = 3.95¢)	4.62¢[17]		4.27¢	4.17¢
Enameling (12 gage)	3.95¢[22]	3.95¢[22]	3.95¢[22]	3.95¢			3.95¢		4.05¢	3.95¢			4.10¢[22]	4.42¢	4.37¢
Long ternes [2] (10 gage)	4.05¢[24]		3.85¢											4.52¢	4.47¢
STRIP															
Hot-rolled [3]	2.80¢	2.80¢	2.80¢	2.80¢[15]	2.80¢		2.80¢					3.60¢[17]	2.95¢	3.27¢	3.22¢
Cold-rolled [4]	3.55¢	3.65¢	3.65¢	3.55¢			3.55¢			(Worcester = 3.75¢)			3.70¢	4.02¢	3.97¢
Cooperage stock	3.10¢	3.10¢			3.10¢		3.10¢							3.57¢	
TINPLATE															
Standard cokes, base box	$5.75	$5.75	$5.75		$5.85			$5.85	$5.85	(Warren, Ohio = $5.75)				$6.175	$6.074
Electro, box 0.25 lb.	Deduct 90¢ from standard coke base box price.														
Electro, box 0.50 lb.	Deduct 70¢ from standard coke base box price.														
Electro, box 0.75 lb.	Deduct 50¢ from standard coke base box price.														
BLACKPLATE, 29 gage[5]	3.90¢	3.90¢	3.90¢		4.00¢			4.00¢	4.00¢					4.32¢	4.22¢
BLACKPLATE, CANMAKING															
55 lb. to 70 lb.	Deduct $1.55 from standard coke base box.														
75 lb. to 95 lb.	Deduct $1.65 from standard coke base box.														
100 lb. to 118 lb.	Deduct $1.55 from standard coke base box.														
TERNES, MFG., Special coated	Deduct 85¢ from standard coke base box price.														
BARS															
Carbon steel	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢					3.625¢[17]	3.05¢	3.35¢	3.32¢
Rail steel[6]	Subject to negotiation because of fluctuating scrap prices.														
Reinforcing (billet)[7]	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢				3.325¢[17]		3.07¢	2.97¢
Reinforcing (rail)	Subject to negotiation because of fluctuating scrap prices.														
Cold-finished[8]	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢							3.70¢	4.00¢	3.97¢
Alloy, hot-rolled	3.30¢	3.30¢	3.30¢			3.30¢	3.30¢	(Bethlehem, Massillon, Canton = 3.30¢)					3.45¢		3.45¢
Alloy, cold-drawn	4.10¢	4.10¢	4.10¢	4.10¢		4.10¢			(Canton = 4.10¢)				4.25¢		
PLATE								(Coatesville = 3.15¢, Claymont = 3.40¢, Geneva, Utah = 3.10¢)							
Carbon steel[12]	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢		2.95¢	2.95¢				3.838¢[14]		3.27¢	3.17¢
Floor plates	4.20¢	4.20¢	4.20¢											4.67¢	4.62¢
Alloy	3.80¢	3.80¢	3.80¢		(Coatesville = 4.50¢)									4.27¢	4.22¢
SHAPES, Structural	2.80¢	2.80¢	2.80¢		2.80¢	2.80¢	(Geneva, Utah = 2.95¢, Bethlehem = 2.80¢)					3.43¢[10]		3.02¢	2.95¢
SPRING STEEL, C-R															
0.06 to 0.40 carbon	3.55¢			3.55¢			(Worcester = 3.75¢)								
0.41 to 0.60 carbon	5.05¢			5.05¢			(Worcester = 5.25¢)								
0.61 to 0.80 carbon	5.65¢			5.65¢			(Worcester = 5.85¢)								
0.81 to 1.05 carbon	7.15¢			7.15¢			(Worcester = 7.35¢)								
1.06 to 1.35 carbon	9.45¢			9.45¢			(Worcester = 9.65¢)								
MANUFACTURERS' WIRE[9]															
Bright	3.55¢	3.55¢		3.55¢	3.55¢		(Worcester = 3.65¢, Duluth = 3.60¢)					4.56¢[13]		3.99¢	3.97¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.60¢	4.60¢		4.60¢	(Worcester = 4.70¢, Duluth = 4.85¢) (Trenton = 4.85¢)							5.28¢[13]		5.04¢	4.96¢
PILING, Steel sheet	3.30¢	3.30¢				3.30¢								3.75¢	3.72¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt	Subject to negotiation			Subject to negotiation		
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	Subject to negotiation			Subject to negotiation		
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt., Beth	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville, Beth, Brackenridge	23.00	22.50	17.50	17.50	21.00	28.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville, Beth, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet, Beth, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton, Brackenridge, Balt, Coatesville	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt, Brackenridge	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.50	23.50	18.50	19.00	26.00	38.00
Strip, c-r, P'gh, Cleve, Jersey City, Reading, Canton Youngstown, Balt, W. Leechburg	32.50	30.50	24.00	24.50	35.00	50.50
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila, Ft. Wayne, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton, W. Leechburg	32.46	30.30	23.80	24.34	34.02	50.26
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	29.76
Tubing, seamless, P'gh, Chi, Canton, Brackenridge, Milwaukee	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, Ohio)*

W	Cr	V	Mo	Co	Base Per lb
18	4	1	—	—	82¢
18	4	1	—	5	$1.29
18	4	2	—	—	93¢
1.5	4	1.5	8	—	59¢
6	4	2	6	—	63¢

High-carbon-chromium*	47¢
Oil hardening manganese*	26¢
Special carbon*	24¢
Extra carbon*	20¢
Regular carbon*	17¢

Warehouse prices on and east of Mississippi are 2¢ per lb. higher; west of Mississippi, 4¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	Per lb
Field grade	4.50¢
Armature	4.80¢
Electrical	5.30¢
Motor	6.05¢
Dynamo	6.75¢
Transformer 72	7.25¢
Transformer 65	7.95¢
Transformer 58	8.65¢
Transformer 52	9.45¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., per 100 lb	$2.75
Angle splice bars, 100 lb	3.25
(F.o.b. basing points)	*per 100 lb*
Light rails (from billets)	$3.10
Light rails (from rail steel), f.o.b. Williamsport, Pa.	3.45

	Base per lb
Cut spikes	4.85¢
Screw spikes	6.90¢
Tie plate, steel	3.05¢
Tie plates, Fittsburg, Calif.	3.20¢
Track bolts	7.00¢
Track bolts, heat treated, to rail roads	7.25¢

Basing points, light rails, Pittsburgh, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, St. Louis, Kansas City, Minnequa, Colo., Birmingham; tie plates alone—Steelton, Pa.; Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa.; Richmond.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$7.05	$14.10

CLAD STEEL

Base prices, cents per pound

Stainless-clad	Plate	Sheet
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	*24.00	*22.00
Nickel-clad 10 pct, f.o.b. Coatesville, Pa.	21.50	....
Inconel-clad 10 pct, f.o.b. Coatesville	30.00	....
Monel-clad 10 pct, f.o.b. Coatesville	24.00	....
Aluminized steel Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Base per keg	Delivered San Francisco
Standard & coated nails	$4.25†	$5.33
Galvanized nails‡‡	4.00†	5.08
Cut nails, carloads, Pittsburgh base	5.30*	....

† 10¢ additional at Cleveland, 35¢ at Worcester. ‡‡ Plus $2.75 per 100 lb galvanizing extra. *Less 20¢ to jobbers.

	Base per 100 lb	
Annealed fence wire	$4.20‡	$5.31
Annealed galv. fence wire	4.65‡	5.66

‡10¢ additional at Worcester.

To the dealer f.o.b. Pittsburgh, Chicago, Birmingham

	Base column	
Woven wire fence*	91	114
Fence posts, carloads	90††	...
Single loop bale ties	91	113
Galvanized barbed wire**	101	121
Twisted barbless wire	101	...

* 15½ gage and heavier. ** On 80-rod spools in carload quantities. ††Pittsburgh, Duluth.

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Alde-cor	Corten	Double Strength No. 1	Dyn-alloy	HI Steel	Mayari R	Otis-coloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55
Sheets									
Hot-rolled	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30
Cold-rolled	5.30	5.30	5.30	....	5.30	5.30	5.30	5.30	5.30
Galvanized	....	5.55	....	....	....	5.00	....	....	....
Strip									
Hot-rolled	4.30	4.30	4.30	....	4.30	4.30	4.30	4.30	4.30
Cold-rolled	....	....	5.30	....	....	5.30	5.30	5.30	5.30†
Shapes	....	4.30	....	....	4.30	4.30	4.30	4.30	....
Beams	....	4.30	....	....	....	4.30	....	....	....
Bars									
Hot-rolled	4.45	4.45	4.45	....	....	4.45	4.45	4.45	4.45
Bar shapes	....	4.45	....	....	4.45	4.45	4.45	4.45	....

† Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh and Lorain, steel buttweld and seamless. Others f.o.b. Pittsburgh only
Base price, $286.00 per net ton

Standard, threaded & coupled

Steel, buttweld	Black	Galv.
½-in.	50½	34½
¾-in.	53½	38½
1-in.	56	41½
1¼-in.	56½	42
1½-in.	57	42½
2 in.	57½	43
2½ and 3-in.	58	43½
Wrought Iron, buttweld		
⅛-in.	+ 7	+29
¼-in.	2½	+19
⅜ and 1¼-in.	8	+11
1½-in.	13½	+ 7½
2-in.	14	+ 7
Steel, lapweld		
2-in.	49	34
2½ and 3-in.	52	37
3½ to 6-in.	54	39
Steel, seamless		
2-in.	48	33
2½ and 3-in.	51	36
3½ to 6-in.	53	38
Wrought Iron, lapweld		
2-in.	5½	+14½
2½ to 3½-in.	8	+10½
4-in.	12	+ 5
4½ to 8-in.	10	+ 6½

Extra Strong, plain ends

Steel, buttweld		
½-in.	49½	35
¾-in.	53½	39
1-in.	55½	42
1¼-in.	56	42½
1½-in.	56½	43
2-in.	57	43½
2½ and 3-in.	57½	44
Wrought Iron, buttweld		
½-in.	+ 2½	+23
¾-in.	3½	+17
1 to 2-in.	13	+ 7
Steel, lapweld		
2-in.	48	34
2½ and 3-in.	52	38
3½ to 6-in.	55½	41½
Steel, seamless		
2-in.	47	33
2½ and 3-in.	51	37
3½ to 6-in.	54½	40½
Wrought Iron, lapweld		
2-in.	8½	+11
2½ to 4-in.	17½	+ ½
4½ to 6-in.	13	+ 5

Basing discounts for standard pipe are for threads and couplings. For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all buttweld. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft, f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft, inclusive.

OD in.	Gage BWG	Seamless Hot-Rolled	Seamless Cold-Drawn	Electric Weld Hot-Rolled	Electric Weld Cold-Drawn
2	13	$16.67	$19.99	$16.17	$19.39
2½	12	22.42	26.87	21.75	26.06
3	12	24.93	29.90	24.18	29.00
3½	11	31.17	37.39	30.23	36.27
4	10	38.69	46.38	37.53	44.99

CAST IRON WATER PIPE

Per net ton

6-in. to 24-in. del'd Chicago $86.12
6-in. to 24-in. del'd New York..... 84.18
6-in. to 24-in., Birmingham 74.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles for all rail shipment; rail and water shipment less 100.00
Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

Percent Off List

½ in. & smaller x 6 in. & shorter.. 45
9/16 & ⅝ in. x 6 in. & shorter..... 46
¾ in. & larger x 6 in. & shorter.... 43
All diam, longer than 6 in. 41
Lag, all diam over 6 in. long..... 44
Lag, all diam x 6 in. & shorter..... 46
Plow bolts 54

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller 43
9/16 to 1 in. inclusive 42
1⅛ to 1½ in. inclusive 40
1⅝ in. and larger 35

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	USS	SAE
7/16 in. and smaller		46
½ in. and smaller	44	..
⅝ in. through 1 in.		44
9/16 in. through 1 in.	43	..
1⅛ in. through 1½ in. ..	41	42
1⅝ in and larger	35	..

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

Packages, nuts separate .... 65 and 10
In bulk 75
On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets (½ in. and larger)

Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $5.65
F.o.b. Lebanon, Pa. 5.80

Small Rivets (7/16 in. and smaller)

Percent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 55

Cap and Set Screws

(In packages) *Percent Off List*

Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright 53
¾ to 1 in. x 6 in., SAE 1035, heat treated 44
Set screws, oval points 56
Milled studs 29
Flat head cap screws, listed sizes.. 16
Fillister head cap, listed sizes..... 37
Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Metallurgical grade, f.o.b. producing plant.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$35.00
65% but less than 70%	34.00
60% but less than 65%	33.00
Less than 60%	32.00

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports*)

Per Gross Ton

Old range, bessemer $5.95
Old range, nonbessemer 5.80
Mesabi, bessemer 5.70
Mesabi, nonbessemer 5.55
High phosphorus 5.55
Prices quoted retroactive to Jan. 1, 1947.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh.....24¢ to 28½¢
Copper, electrolytic, 100 and 325 mesh .....30⅝¢ to 34⅝¢
Copper, reduced, 150 and 200 mesh .....30½¢ to 32¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe carlots... 10¢ to 17¢
Swedish sponge iron, 100 mesh, c.l.f. N. Y., carlots, ocean bags 7.4¢ to 8.5¢
Domestic sponge iron, minus 48 mesh ..... 10¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots ..... 8¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots ..... 63¢ to 80¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe ..... 44¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe..... 39½¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe.....90¢ to $1.75
Aluminum, 100, 200 mesh, carlots .....23¢ to 29¢
Antimony, 100 mesh ..... 44¢
Cadmium, 100 mesh $2.00
Chromium, 100 mesh and finer .. $1.025
Lead, 100, 200 & 300 mesh 20½¢ to 25½¢
Manganese, minus 325 mesh and coarser ..... 59¢
Nickel, 100 mesh ..... 51½¢
Silicon, 100 mesh ..... 29¢
Solder powder, 100 mesh..8½¢ plus meta
Stainless steel, 302, minus 100 mesh...75¢
Tin, 100 mesh ..... 90¢
Tungsten metal powder, 98%-99%, any quantity, per lb..... $3.05
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb. $2.65
Under 100 lb $2.90

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$12.00 to $13.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	13.50 to 14.50
Foundry, Byproduct	
Chicago, del'd	$18.60
Chicago, f.o.b.	17.50
New England, del'd	19.75
Seaboard, Kearney, N. J., f.o.b.	17.85
Philadelphia, del'd	17.83
Swedeland, Pa., f.o.b.	16.90
Buffalo, del'd	18.75
Ashland, Ohio, f.o.b.	15.50
Painesville, Ohio, f.o.b.	16.60
Erie, del'd	19.95
Cleveland, del'd	17.90
Cincinnati, del'd	18.59
St. Louis, del'd	18.03
Birmingham, del'd	15.76

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

Carloads, Per 1000

No. 1, Ohio $67.00
First quality, Pa., Md., Ky., Mo., Ohio 73.00
First quality, New Jersey 78.00
Sec. quality, Pa., Md., Ky., Mo., Ohio 67.00
Sec. quality, New Jersey 70.00
No. 2, Ohio 59.00
Ground fire clay, net ton, bulk..... 10.50

Silica Brick

Pennsylvania and Birmingham $73.00
Chicago District and Alabama 82.00
Silica cement, net ton (Eastern)... 12.50
East Chicago 13.50

Chrome Brick

Per Net Ton

Standard chemically bonded, Balt., Plymouth Meeting, Chester $64.00

Magnesite Brick

Standard, Balt. and Chester $86.00
Chemically bonded, Baltimore 75.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in bulk $46.50
Domestic, f.o.b. Chewelah, Wash., in bulk 24.00
in sacks 28.00

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest; add 10¢; Missouri Valley; add 30¢..$11.00

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$4.47	$5.73	$5.82	$4.78	$5.68	$4.82	$4.55	$4.83	$5.53	$8.34	$8.44	$9.85	$9.95
New York	4.71	5.72[1]	6.11	5.03	5.86	5.06	4.75	5.02	5.57	8.40	8.50	9.92	10.02
Boston	4.76	5.63[12]	6.18[13]	4.78	6.73	5.11	4.82	4.98	5.63	8.62	8.72	9.98	10.08
Baltimore	4.31	....	5.71	4.78	....	4.76	4.68	4.81	5.51	....	....	....	....
Norfolk	4.80	....	....	5.20	....	5.05	5.05	5.10	5.90	....	....	....	....
Chicago	4.25	5.10	5.65	4.35	5.45	4.60	4.40	4.40	5.10	8.05	8.15	9.30	9.40
Milwaukee	4.429	5.279[1]	5.829	4.529	5.629[5]	4.779	4.579	4.579	5.279	8.379	8.479	9.629	9.729
Cleveland	4.25	4.95	5.78	4.52	5.00	4.80†	4.65	4.40	5.10	8.33	8.43	9.30	9.40
Buffalo	4.25	5.10	6.00	4.70	5.65[5]	4.95	4.40‡	4.40‡	5.10	8.05	8.15	9.30	9.40
Detroit	4.35	5.20	6.02	4.72	5.63	4.88†	4.77	4.50	5.22	8.50	8.60	9.73	9.78
Cincinnati	4.51	5.19	5.74	4.74	5.70	4.95	4.79	4.75	5.45	....	....	....	....
St. Louis	4.58	5.43[1]	5.87	4.68	5.82	4.88	4.73	4.73	5.47	8.57	8.67	9.82	9.92
Pittsburgh	4.25	5.10[1]	5.65	4.35	....	4.60	4.40	4.40	5.10	8.05	8.15	9.30	9.40
St. Paul	4.63	5.48[1]	5.88[2]	4.73[7]	....	4.93[7]	4.78[7]	4.78[7]	5.91[8]	....	....	....	....
Omaha	5.165	....	6.565	5.265	....	5.515	5.315	5.315	6.015	....	....	....	....
Indianapolis	4.553	5.324	5.874	4.653	5.753	4.903	4.703	4.703	5.403	....	....	....	....
Birmingham	4.45[11]	....	5.65	4.45[11]	....	4.65[11]	4.40[11]	4.40[11]	6.04	....	....	....	....
Memphis	4.82[11]	5.87[1]	6.37	5.02[11]	....	5.17[11]	4.97[11]	4.97[11]	5.87	....	....	....	....
New Orleans	*4.99[11]	6.28[1]	....	5.19[11]	....	5.34[11]	*5.04[11]	*5.14[11]	6.28[6]	....	....	....	....
Houston	5.30	....	6.60	5.25	....	5.35	5.15	5.30	6.80	9.40[17]	9.20[17]	10.35[17]	10.45[17]
Los Angeles	5.75	7.35[1]	7.40	6.05	8.70[5]	5.55	5.35	5.50	7.35[14]	9.55[15]	9.35[15]	10.95[15]	11.05[15]
San Francisco	5.40[8]	6.65	6.85	5.75[8]	....	5.50	5.20	5.05	7.50[10]	9.55[15]	9.35[15]	10.95[15]	11.05[15]
Seattle	5.45[4]	7.25[2]	6.85	5.60[4]	....	5.60[4]	5.25[4]	5.45[4]	7.45[14]	....	8.55[16]	....	11.15[16]
Portland	5.30[4]	7.10[2]	6.70	5.60[4]	....	5.45[4]	5.25[4]	5.55[4]	7.45[14]	....	....	....	....
Salt Lake City	6.40	....	7.85	6.70	....	6.20	6.35	6.65	7.55	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 to 1999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 450 to 1499 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) 1000 to 1999 lb.

* Add 46¢ for sizes not rolled in Birmingham.

† Up to ¾ in. thick and 90 in. wide.

‡ Add 35¢ for sizes not rolled at Buffalo.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

BASING POINT PRICES						DELIVERED PRICES (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	37.00	37.50	38.00	38.50	.....	Boston	Everett	$0.50 Arb.	.....	45.50	46.00	.....	.....
Birmingham	32.88-35.88	33.38-36.38	.....	.....	.....	Boston	Steelton	5.30	.....	.....	.....	.....	47.30
Buffalo	36.00-39.50*	36.00-40.00*	36.50-40.50*	.....	.....	Brooklyn	Bethlehem	3.30	40.30	40.80	41.30	41.80	.....
Chicago	37.50	38.00	38.50	39.00	.....	Cincinnati	Birmingham	5.36	38.24-41.25	38.74-41.74	.....	.....	.....
Cleveland	35.50-39.25*	36.00-39.75*	36.50-40.25*	.....	.....	Jersey City	Bethlehem	2.02	39.02	39.52	40.02	40.52	.....
Duluth	38.00	38.50	39.00	39.50	.....	Los Angeles	Provo	6.53	42.53	43.03	.....	.....	.....
Erie	37.50	38.00	38.50	39.00	.....	Mansfield	Cleveland-Toledo	2.56	38.06-41.81*	38.56-42.31*	39.06-42.81*	39.56	.....
Everett	.....	45.00	45.50	.....	.....	Philadelphia	Bethlehem	1.84	38.84	39.34	39.84	40.34	.....
Granite City	36.50	37.00	37.00	.....	.....	Philadelphia	Swedeland	1.11	46.11	46.61	47.11	47.61	.....
Neville Island	36.00	36.50	36.50	37.00	.....	Philadelphia	Steelton	2.38	39.38	.....	.....	.....	44.38
Provo	36.00	36.50	.....	.....	.....	San Francisco	Provo	6.53	42.53	43.03	.....	.....	.....
Sharpsville	38.00	36.50	36.50	37.00	.....	Seattle	Provo	6.53	42.53	43.03	.....	.....	.....
Steelton	37.00	.....	.....	.....	42.00	St. Louis	Granite City	0.75 Arb.	37.25	37.75	37.75	.....	.....
Struthers, Ohio	36.50	.....	.....	.....	.....								
Swedeland	45.00	45.50	46.00	46.50	.....								
Toledo	37.50	38.00	38.50	39.00	.....								
Troy, N. Y.	37.00	37.50	38.00	38.50	42.00								
Youngstown	38.00	38.50	38.50	39.00	.....								

* Republic Steel Corp. price. Basis: Average price of No. 1 hvy. mlt. steel scrap at Cleveland or Buffalo respectively as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$45.50; f.o.b. Buffalo—$48.75. Add $1.25 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorous $50.00 per gross ton, f.o.b. Lyles, Tenn. Delivered Chicago, $56.04. High phosphorous charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockwood, Tenn.

Carload lots (bulk)	$145
Less ton lots (packed)	189
Delivered Pittsburgh	151

$1.80 for each 1% above 82% Mn; penalty, $1.80 for each 1% below 78%.

Briquets

Cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	8.70	8.95	9.50
Ton lots	10.30	10.90	12.80
Less ton lots	11.20	11.80	13.70

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$46.00	$47.00
F.o.b Pittsburgh	50.00	51.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	34
L.c.l. lots	34

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	33
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.07% max. C. 0.06% P. 90% mn.	23.00	24.85	26.05
0.10% max. C	22.50	24.35	25.55
0.15% max. C	22.00	23.85	25.05
0.30% max. C	21.50	23.35	24.55
0.50% max. C	21.00	22.85	24.05
0.75% max. C. 7.00% max. Si	18.00	19.85	21.05

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	7.80
Ton lots	9.45

Briquets

Contract basis, carlots, bulk freight allowed, per lb of briquet

	8.75
Ton lots	10.35
Less ton lots	11.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $73.00 f.o.b. Keokuk, Iowa; $73.75 f.o.b. Niagara Falls; $70.75, f.o.b. Jackson, Ohio. Electric furnace silvery iron is not being produced at Jackson. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add 50¢ per ton for each 0.50 pct Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe	16.90	17.50	18.10
97% Si, 1% Fe	17.30	17.90	18.50

Silicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination. 40% Si. 1 lb Si briquets.

	Eastern	Central	Western
Carload, bulk	5.25	5.50	5.70
Ton lots	6.85	7.45	7.75
Less ton lots	7.75	8.35	8.65

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
25% Si	15.50	....	....
50% Si	9.30	9.80	10.00
75% Si	11.80	12.10	12.85
85% Si	13.30	13.60	14.35
90% Si	15.00	15.30	16.00

Ferrochrome (65-72% Cr, 1% max. Si)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	26.50	26.90	27.00
0.10% C	26.00	26.40	26.50
0.15% C	25.50	25.90	26.00
0.20% C	25.25	25.65	25.75
0.50% C	25.00	25.40	25.50
1.00% C	24.50	24.90	24.75
2.00% C	24.25	24.65	24.75
65-69% Cr, 4-9% C	18.60	19.00	19.15
62-66% Cr. 4-6% C. 6-9% Si.	18.60	19.00	19.15

Briquets

Contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	12.50	12.75	12.85
Ton lots	14.00	14.90	15.50
Less ton lots	14.90	15.80	16.40

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S M Ferrochrome

Contract price, cents per pound chrominum contained, lump sie, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	19.70	20.10	20.25
Ton lots	21.85	23.15	23.95
Less ton lots	23.35	24.65	25.45

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	25.00	25.40	25.50
Ton lots	27.30	27.95	29.15
Less ton lots	29.10	29.75	30.95

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, packed, f.o.b. shipping point, freight allowed, 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	97.00	98.50	99.75
0.50% max. C	93.00	94.50	95.75
9.00% min. C	91.50	93.00	94.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	16.25	16.75	18.80
Ton lots	19.35	20.10	22.25
Less ton lots	20.85	21.60	23.75

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	17.50	18.00	20.05
Ton lots	19.80	20.65	22.40
Less ton lots	20.80	21.65	23.40

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast Turnings	Distilled
Ton lots	$1.85	$2.70 $3.40
Less ton lots	2.20	3.05 4.20

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	18.00	19.10	21.05
Less ton lots	19.25	20.35	22.30

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn. 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

	Eastern	Central	Western
Ton lots	15.75	16.85	18.80
Less ton lots	17.00	18.10	20.05

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, f.o.b. plant Niagara Falls, Washington, Pa. York, Pa., per pound contained W, 5 ton lots, freight allowed	$2.25
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.	
Openhearth	$3.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2	$1.20
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb	
Ton lots	$2.50
Less ton lots	$2.55
Ferromolybdenum, 55-75%, f.o.b Langeloth, Washington, Pa., per pound contained Mo.	95¢
Calcium molybdate, 40-45%, f.o.b Langeloth, Washington, Pa., Per pound contained Mo.	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo.	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo.	80¢
Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y. ton lots, per pound contained Ti	$1.33
Less ton lots	$1.38
Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti	$1.30
Less ton lots	$1.40
High carbon ferotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton	$142.50
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. (Siglo) Tenn., $3 unitage per gross ton	$65.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	18.40¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	
Carload, bulk	6.00¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	6.90¢
Ton lots	7.40¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Car lots	9.00¢
Ton lots	9.75¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed. Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
100 lb or more	$1.20	$1.23	$1.21

Manganese — Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.044

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$1.80	$1.8135	$1.8441

Silcaz, contract basis, f.o.b. plant freight allowed, per pound.

Carload lots	39.00¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed on 50 lb and over

No. 1	93¢
No. 6	63¢
No. 79	45¢

Bortram, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Carbortam, f.o.b., Suspension Bridge, N. Y., freight allowed, Ti 15—17%, B 0.90—1.15%, Si 2.5—3.0% Al 1.0—2.0%.

Ton lots, per pound	8.0¢

Houston Sheffield Plant Production 150 Pct Over Output Planned in 1941

Houston

• • • **Steel production at the Houston Sheffield plant, now is one and one half times greater than planned when the project was established in 1941. An additional expansion program, details of which have not yet been worked out, is planned.**

The output of the plant has been stepped up to 35,000 net tons per month. This steel, which goes into plates, bars, angles, rods, wire, nails, and other items, flows from a battery of six openhearth furnaces which are in operation night and day.

Charles R. Hook, Middletown, O., president of American Rolling Mill Co., parent Sheffield company, has indicated that additional expansion is anticipated.

R. L. Gray, Sheffield president, who recently declared that the company will develop its existing facilities thoroughly before starting work on additional units, said that firing of the sixth openhearth furnace increased the Houston mill's capacity by 20 pct and the number of persons employed from about 3000 to about 3500.

Scrap iron and scrap steel, available in this section of the country in abundance, is the basic raw material used in the operation of the openhearth furnaces. By adding hot metal to the charge, the production of each of the furnaces is increased 25 pct. This pig iron is produced mainly from east Texas iron ores in a 700-ton blast furnace. The furnace, built by the government during the war, is now operated by Sheffield under lease.

Sheffield originally constructed three openhearth furnaces at the Houston plant. During the war, when steel was urgently needed, the government built two more. The company purchased these two government-owned furnaces after the war and constructed a sixth.

When the sixth openhearth was placed in operation the plant's capacity was double that of the first three units. Since the use of pig iron adds 25 pct to the output of each furnace, the grand total production is one and one half times that originally contemplated.

BEAT THE STEEL SHORTAGE

-use Steel that DOES more!

By replacing carbon steel with U·S·S Cor-Ten or U·S·S Man-Ten where economically applicable, you can:—

1. Make your steel supply go one-third farther, NOW.

By taking advantage of the higher physical properties of these steels you can use thinner sections to produce units that weigh one-fourth less—that are substantially stronger and more durable—that require one-fourth less steel per unit. As a result you can produce as much as one-third more units from every ton of steel used.

2. Make better products—lighter, long lasting and generally more profitable to the user, NOW.

In addition to saving steel, lightweight construction with steel that *does* more has other proved economic advantages. Every pound of weight saved pays off in reduced operating costs, increased capacity to do work, and lower maintenance expense. These steels, by saving weight, make equipment more efficient—more productive.

3. Satisfy more customers, NOW.

The one-third *additional* units you can turn out, —without using more steel—mean that you can serve more customers, create more good will, and make more money because you have more units to sell. And you can do this NOW—without waiting for the completion of new steel making facilities.

4. Get these benefits at little or no greater cost per unit than NOW.

Because both U·S·S Cor-Ten and U·S·S Man-Ten, like plain carbon steel, can be readily fabricated—because one fourth less steel is required per unit, with consequent reduction in shipping costs—because fixed charges can be spread over one-third more units—your finished product can be built at little or no increase in cost. Frequently, as in the case of freight cars, mine cars, trucks and trailers, it may actually cost less per ton of capacity.

TO HELP YOU *adapt these steels to your product* immediately—*and with least change in your shop methods—we have a special metallurgical and engineering staff thoroughly familiar with what these steels can do. Phone, wire or write.*

U·S·S COR-TEN · U·S·S MAN-TEN · U·S·S ABRASION-RESISTING · U·S·S MANGANESE-NICKEL-COPPER

USS HIGH STRENGTH STEEL UNITED STATES STEEL

8-309

UNITED STATES STEEL AMERICAN STEEL & WIRE COMPANY, Cleveland, Chicago & New York
CARNEGIE-ILLINOIS STEEL CORPORATION, Pittsburgh & Chicago · COLUMBIA STEEL COMPANY, San Francisco
NATIONAL TUBE COMPANY, Pittsburgh · TENNESSEE COAL, IRON & RAILROAD COMPANY, Birmingham
UNITED STATES STEEL SUPPLY COMPANY, Warehouse Distributors—Coast to coast · UNITED STATES STEEL EXPORT COMPANY, New York

American Brake Shoe Opens Two Additional Nonferrous Foundries

New York

• • • **American Brake Shoe** Company's two new nonferrous foundries recently completed at Niles, Ohio, and Meadville, Pa., were opened December 8 and 9, respectively, according to an announcement by Thomas W. Pettus, president of the National Bearing Div. of American Brake Shoe.

The new Meadville plant, replacing an older plant of the Division formerly located there, will produce bronze bearings and castings. It will specialize in copper, brass and bronze for railroads, steel mills, and many other industries, and in precision machine bearings for diesel engines and other high-speed and heavy duty service.

The Meadville plant consists of a main foundry building, a two-story modern office building and a separate unit housing a heating plant. Constructed of concrete and brick, the main foundry is rectangular shaped and has a total of 185,000 sq ft of floor space. It also houses a machine shop.

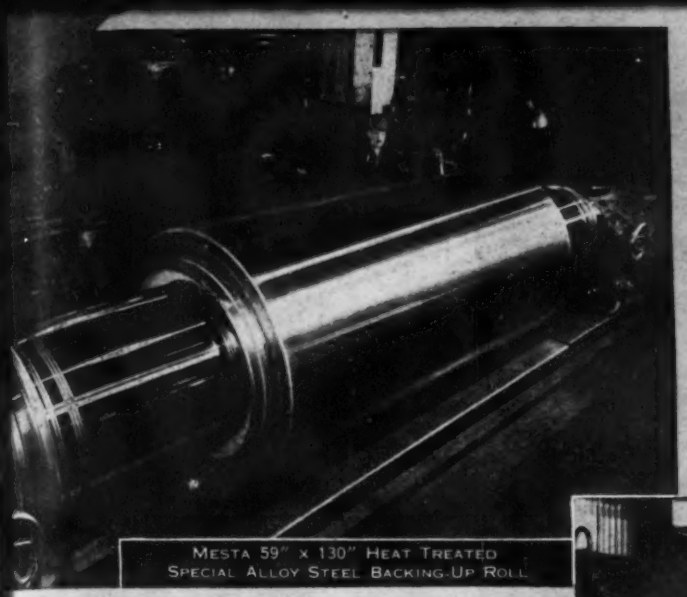
The new foundry at Niles, Ohio, which will manufacture railroad journal bearings, is located in the heart of a three-state railway supply area which includes many car manufacturing plants.

Consisting of a foundry and machine shop, the new Niles plant is a one-story T-shaped structure having 35,000 sq ft of floor space. It is constructed of structural steel, reinforced concrete and brick.

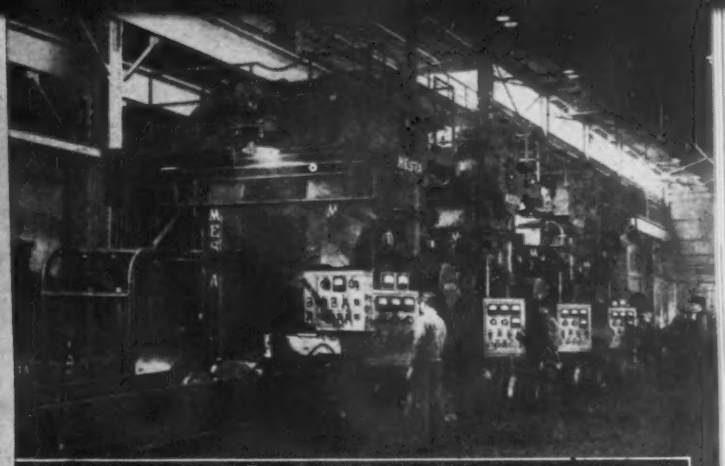
James Stewart & Co., Inc. constructed the new Niles plant. Ragnar Benson, Inc. constructed the new Meadville plant. J. Gordon Turnbull Company of Cleveland, Ohio, were architects for both new foundries.

Besides the new plants, the National Bearing Div. operates five other plants located in the following cities: Chicago, Jersey City, St. Louis, St. Paul, and Portsmouth, Va.

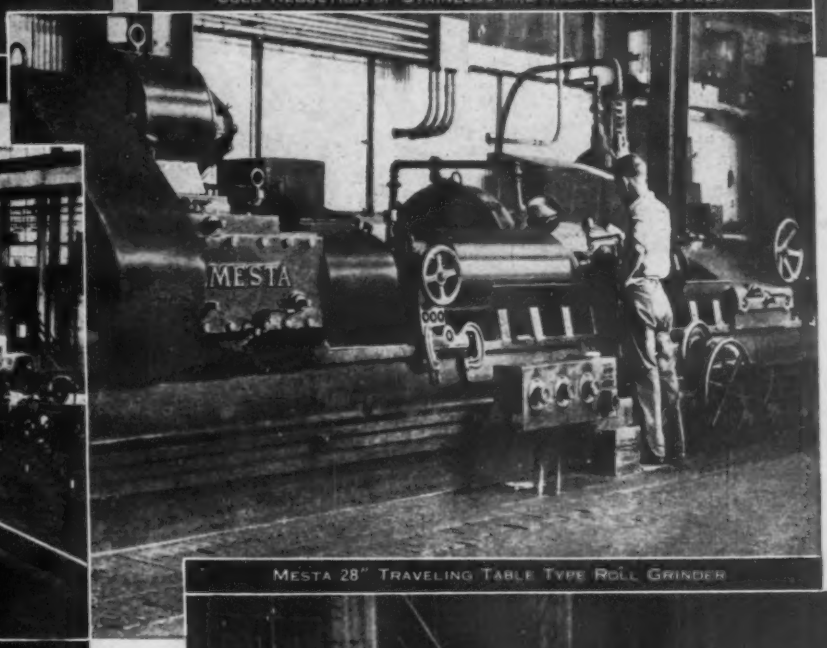
The Meadville and Niles plants are two of six new plants which the American Brake Shoe Co. has constructed under its $15 million plant modernization and expansion program.



MESTA 59" x 130" HEAT TREATED
SPECIAL ALLOY STEEL BACKING-UP ROLL

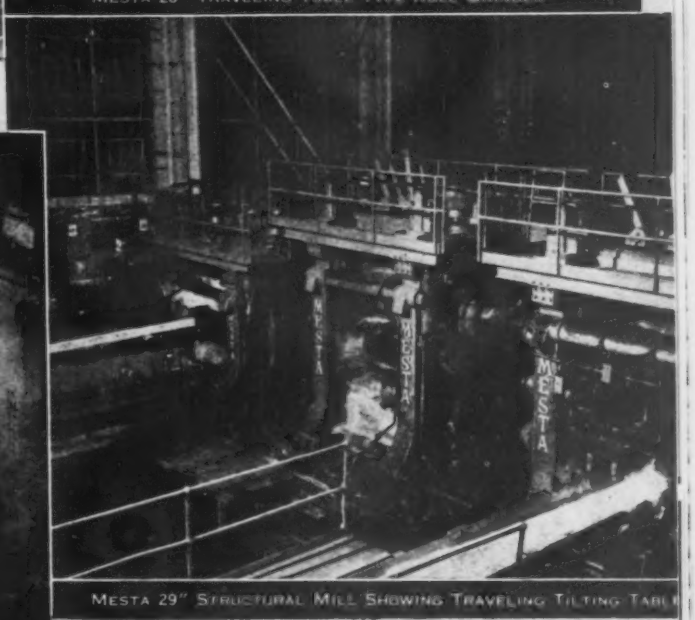


MESTA 28" FOUR-STAND TANDEM MILL FOR THE
COLD REDUCTION OF STAINLESS AND HIGH SILICON STEELS



MESTA 28" TRAVELING TABLE TYPE ROLL GRINDER

MESTA 18" - 14" - 10" MERCHANT MILL



MESTA 29" STRUCTURAL MILL SHOWING TRAVELING TILTING TABLE

THE FIRST FOUR-HIGH TANDEM MILL INSTALLED IN THIS COUNTRY
FOR THE PRODUCTION OF WIDE ALUMINUM STRIP SHEETS

MESTA MACHINE COMPANY · PITTSBURGH, PA.

PRICES AND PRODUCTION

Cold-Finished Steel Bars at Pittsburgh

(cents per pound)

	1929	1933	1934	1935	1936	1937
January	1.90	1.70	2.10	2.10	2.10	2.55
February	1.90	1.70	2.10	2.10	2.10	2.55
March	1.90	1.70	2.10	2.10	2.10	2.83
April	1.95	1.70	2.10	2.10	2.10	2.90
May	1.95	1.70	2.10	1.95	2.10	2.90
June	1.95	1.70	2.10	1.95	2.10	2.90
July	1.95	1.70	2.10	1.95	2.25	2.90
August	1.95	1.70	2.10	1.95	2.25	2.90
September	1.94	1.95	2.10	1.95	2.25	2.90
October	1.90	1.95	2.10	1.95	2.35	2.90
November	1.90	1.95	2.10	1.95	2.35	2.90
December	1.90	2.10	2.10	1.95	2.35	2.90
Average	1.92	1.80	2.10	1.99	2.20	2.84

	1938	1939		1945	1946	1947
January	2.90	2.70		2.65	2.75	3.20
February	2.90	2.70		2.65	2.93	3.20
March	2.90	2.70	1944	2.65	3.10	3.20
April	2.90	2.70	1943	2.65	3.10	3.20
May	2.90	2.68	1942	2.65	3.10	3.20
June	2.70	2.65	1941	2.65	3.10	3.20
July	2.70	2.65	1940 price fixed	2.65	3.10	3.27
August	2.70	2.65	at	2.73	3.10	3.55
September	2.70	2.65	2.65	2.75	3.10	3.55
October	2.70	2.65		2.75	3.10	3.55
November	2.70	2.65		2.75	3.10	3.55
December	2.70	2.65		2.75	3.10	3.55
Average	2.78	2.67		2.69	3.06	3.35

Plates at Pittsburgh

(cents per pound)

	1929	1932	1933	1934	1935	1936
January	1.90	1.50	1.60	1.70	1.80	1.80
February	1.90	1.50	1.60	1.70	1.80	1.80
March	1.90	1.52	1.60	1.70	1.80	1.80
April	1.95	1.60	1.55	1.74	1.80	1.80
May	1.95	1.60	1.50	1.85	1.80	1.80
June	1.95	1.60	1.53	1.85	1.80	1.80
July	1.95	1.60	1.60	1.81	1.80	1.90
August	1.95	1.60	1.60	1.80	1.80	1.90
September	1.95	1.60	1.60	1.80	1.80	1.90
October	1.94	1.60	1.70	1.80	1.80	1.90
November	1.90	1.60	1.70	1.80	1.80	1.90
December	1.90	1.60	1.70	1.80	1.80	1.90
Average	1.93	1.57	1.61	1.78	1.80	1.85

	1937	1938		1945	1946	1947
January	2.05	2.25		2.10	2.25	2.65
February	2.05	2.25	1944	2.10	2.38	2.65
March	2.21	2.25	1943	2.20	2.50	2.65
April	2.25	2.25	1942	2.20	2.50	2.65
May	2.25	2.25	1941	2.21	2.50	2.65
June	2.25	2.22	1940	2.25	2.50	2.71
July	2.25	2.10	1939 price fixed	2.25	2.50	2.95
August	2.25	2.10	at	2.25	2.50	2.95
September	2.25	2.10	2.10	2.25	2.50	2.95
October	2.25	2.10		2.25	2.50	2.95
November	2.25	2.10		2.25	2.50	2.95
December	2.25	2.10		2.25	2.50	2.95
Average	2.21	2.17		2.21	2.47	2.80

Hot-Rolled Sheets at Pittsburgh

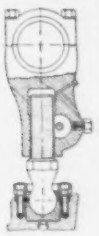
(cents per pound)

	1929	1934	1935	1936	1937	1938
January	2.10	1.75	1.85	1.85	2.15	2.40
February	2.10	1.75	1.85	1.85	2.15	2.40
March	2.10	1.75	1.85	1.85	2.35	2.40
April	2.10	1.81	1.85	1.85	2.40	2.40
May	2.13	2.00	1.85	1.85	2.40	2.38
June	2.20	2.00	1.85	1.87	2.40	2.27
July	2.14	1.88	1.85	1.95	2.40	2.15
August	2.10	1.85	1.85	1.95	2.40	2.15
September	2.10	1.85	1.85	1.95	2.40	2.15
October	2.10	1.85	1.85	1.95	2.40	2.03
November	2.10	1.85	1.85	1.95	2.40	2.15
December	2.18	1.85	1.85	2.15	2.40	2.15
Average	2.12	1.85	1.85	1.92	2.35	2.25

	1933	1940		1945	1946	1947
January	2.15	2.10		2.10	2.20	2.50
February	2.15	2.10		2.10	2.31	2.50
March	2.15	2.10	1944	2.18	2.425	2.50
April	2.15	2.10	1943	2.20	2.425	2.50
May	2.06	1.98	1942	2.20	2.425	2.50
June	2.00	2.10	1941	2.20	2.425	2.50
July	2.00	2.10	price fixed	2.20	2.425	2.56
August	2.00	2.10	at	2.20	2.425	2.80
September	2.00	2.10	2.10	2.20	2.425	2.80
October	2.00	2.10		2.20	2.425	2.80
November	2.02	2.10		2.20	2.425	2.80
December	2.10	2.10		2.20	2.485	2.80
Average	2.06	2.09		2.18	2.40	2.63

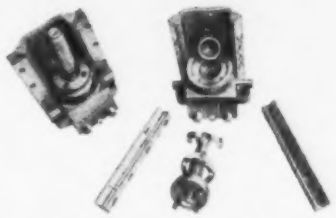
Presses outsell all other makes

③ CONNECTIONS



Another feature is solid, plug-clamp connection strap, which gives full 360° bearing against slide adjusting screw. This arrangement also permits using V-thread on screw, making replacement easy.

④ SLIDE ASSEMBLY

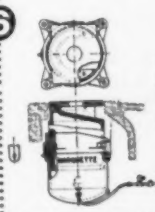


Slides are accurately gibbed to insure precise registry of die and punch. Ball seat is renewable, as are split bronze ball-cap bushings and laminated shim against which ball-cap is brought down by four bolts to give correct clearance for proper lubrication and fit. All parts are machined to close tolerances for interchangeability. For a fraction of the cost of a new slide, you can recondition the ball seat bearing.

⑤ BEARINGS, WAYS AND GIBS

Main shaft bearings and connection bearings are bronze bushed. Roller Bearings are standard for drive shaft bearings on large geared presses. All wearing surfaces are especially finished to insure long life.

⑥ CUSHIONS

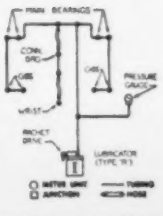


Every Bliss Inclinable Press is designed to accommodate Bliss Marquette die cushions which extend the press application to drawing operations on medium gauge metal.

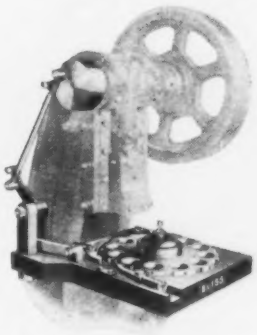
Many Bliss cushions are supplied for presses that have been in use for years. Placing the responsibility for efficient press and cushion operation with Bliss assures you of the utmost in satisfactory performance.

⑦ LUBRICATION

Bliss Inclinables have floor-line lubrication systems with oil or grease fittings at main points of moving contact. All standard Bliss Inclinable frames are machined to take Bijur one-shot pressure system.



⑧ FEEDS



Bliss Inclinable Presses are designed to take any type of Bliss automatic or semi-automatic feed. Addition of a few extra parts to the regular constant tension brake will convert it to an automatic releasing brake for continuous operation with roll, dial or magazine feeds. Every Bliss feed is engineered to specific requirements yet a large variety of standard designs is available. A Bliss feed on a Bliss press means the finest equipment that money can buy, plus a *single responsibility* for efficient performance of entire unit.

⑨ SERVICE

All replacement parts and service orders carry *top priority* at Bliss to reduce your press "down time." Supplying service parts for presses more than 50 years old is routine at Bliss. Accurate-fitting parts are supplied from stock by virtue of precision manufacturing methods which guarantee interchangeability. A large sales and service organization is available. Incidentally, one effective way of preventing costly shutdowns is to call for a Bliss service inspection of your Bliss presses. A highly competent maintenance man will call on you and the chances are that he will spot trouble before it happens.

The Bliss plant at Hastings, Michigan is specially equipped for quantity production of parts for Inclinable Presses.

These are the reasons—plus the fact that *they are priced right*—that are most often reported by the trade for its preference of Bliss presses.

If your pressed-metal production calls for inclinable presses, you're sure to find the specific answer among Bliss' 20 standard sizes. And a Bliss sales engineer will be on hand to give you unbiased counsel. Remember too, "BLISS" on your press is more than a name...it's a guarantee!

Write today for catalog 2-B illustrating the new Bliss Inclinable Presses and Service Sheet A-105 giving operating and maintenance instructions for the complete line.

E. W. BLISS CO., 440-A AMSTERDAM, DETROIT 2, MICH.

Mechanical and Hydraulic Presses, Rolling Mills, Can and Container Machinery

WORKS AT: Toledo, Cleveland, Salem, Ohio; Hastings, Mich.; Englewood, N. J.; Derby, England; St. Ouen sur Seine, France. SALES OFFICES AT: Detroit, Hastings, Mich.; New York, Rochester, N. Y.; Cleveland, Dayton, Toledo, Ohio; Philadelphia, Pittsburgh, Pa.; Chicago, Ill.; Boston, Mass.; New Haven, Conn.; Windsor, Ont.

STAY AHEAD WITH *Bliss*

BLISS BUILDS MORE TYPES AND SIZES OF PRESSES THAN ANY OTHER COMPANY

PRICES AND PRODUCTION

Cold-Rolled Sheets at Pittsburgh
(cents per pound)

	1929	1933	1934	1935	1936	1937
January	4.10	2.35	2.75	2.95	2.95	3.25
February	4.10	2.25	2.75	2.95	2.95	3.25
March	4.10	2.30	2.75	2.95	2.95	3.49
April	4.10	2.30	2.85	2.95	2.95	3.55
May	4.10	2.34	3.15	2.95	2.95	3.55
June	4.10	2.29	3.15	2.95	2.95	3.55
July	4.10	2.40	2.99	2.95	3.05	3.55
August	4.08	2.47	2.95	2.95	3.05	3.55
September	4.00	2.75	2.95	2.95	3.05	3.55
October	4.00	2.75	2.95	2.95	3.05	3.55
November	4.00	2.75	2.95	2.95	3.05	3.55
December	3.98	2.75	2.95	2.95	3.25	3.55
Average	4.06	2.48	2.98	2.95	3.02	3.49

	1938	1939	1940		1946	1947
January	3.55	3.20	3.05		3.05	3.20
February	3.50	3.20	3.05		3.16	3.20
March	3.45	3.20	3.05	1945	3.275	3.20
April	3.45	3.20	2.93	1944	3.275	3.20
May	3.43	3.11	3.05	1943	3.275	3.20
June	3.32	3.05	3.05	1942	3.275	3.20
				1941		
July	3.20	3.05	3.05	price	3.275	3.27
August	3.20	3.05	3.05	fixed	3.275	3.55
September	3.20	3.05	3.05	at	3.275	3.55
October	3.08	3.05	3.05	3.05	3.275	3.55
November	3.20	3.05	3.05		3.275	3.55
December	3.20	3.05	3.05		3.215	3.55
Average	3.31	3.10	3.04		3.242	3.35

Galvanized Sheets at Pittsburgh
(cents per pound)

	1929	1932	1933	1934	1935	1936
January	3.60	2.80	2.68	2.85	3.10	3.10
February	3.60	2.75	2.50	2.85	3.10	3.10
March	3.60	2.85	2.60	2.85	3.10	3.10
April	3.60	2.85	2.63	2.95	3.10	3.10
May	3.60	2.85	2.70	3.25	3.10	3.10
June	3.60	2.85	2.70	3.25	3.10	3.10
July	3.60	2.85	2.85	3.13	3.10	3.20
August	3.50	2.81	2.85	3.10	3.10	3.20
September	3.50	2.75	2.85	3.10	3.10	3.20
October	3.50	2.85	2.85	3.10	3.10	3.20
November	3.48	2.85	2.85	3.10	3.10	3.20
December	3.40	2.85	2.85	3.10	3.10	3.40
Average	3.55	2.83	2.74	3.05	3.10	3.17

	1937	1938		1945	1946	1947
January	3.40	3.80		3.50	3.70	3.55
February	3.40	3.80	1944	3.50	3.88	3.55
March	3.72	3.80	1943	3.62	4.05	3.55
April	3.80	3.80	1942	3.65	4.05	3.55
May	3.80	3.80	1941	3.68	4.05	3.55
June	3.80	3.68	1940	3.70	4.05	3.55
			1939			
July	3.80	3.50	price	3.70	4.05	3.63
August	3.80	3.50	fixed	3.70	4.05	3.95
September	3.80	3.50	at	3.70	4.05	3.95
October	3.80	3.45	3.50	3.70	4.05	3.95
November	3.80	3.50		3.70	4.05	3.95
December	3.80	3.50		3.70	*3.65	3.95
Average	3.73	3.64		3.65	3.99	3.72

* Based on 10 gage since December 1946; 24 gage base up to that time.

Tinplate at Pittsburgh
(per base box)

	1929	1930	1931	1932	1933	1934
January	$5.35	$5.25	$5.00	$4.75	$4.25	$5.25
February	5.35	5.25	5.00	4.75	4.25	5.25
March	5.35	5.25	5.00	4.75	4.25	5.25
April	5.35	5.25	5.00	4.75	4.25	5.25
May	5.35	5.25	5.00	4.75	4.25	5.25
June	5.35	5.25	5.00	4.75	4.25	5.25
July	5.35	5.25	5.00	4.75	4.25	5.25
August	5.35	5.25	5.00	4.75	4.25	5.25
September	5.35	5.25	5.00	4.75	4.65	5.25
October	5.35	5.00	4.75	4.75	4.65	5.25
November	5.35	5.00	4.75	4.55	4.65	5.25
December	5.35	5.00	4.75	4.25	5.25	5.25
Average	5.35	5.19	4.94	4.69	4.43	5.25

	1935	1936	1937	1938		1947
January	$5.25	$5.25	$4.85	$5.35		$5.75
February	5.25	5.25	4.85	5.35	1946	5.75
March	5.25	5.25	4.85	5.35	1945	5.75
April	5.25	5.25	5.35	5.35	1944	5.75
May	5.25	5.25	5.35	5.35	1943	5.75
June	5.25	5.25	5.35	5.35	1942	5.75
					1941	
July	5.25	5.25	5.35	5.35	1940	5.75
August	5.25	5.25	5.35	5.35	1939	5.75
September	5.25	5.25	5.35	5.35	price	5.75
October	5.25	5.25	5.35	5.35	fixed	5.75
November	5.25	5.25	5.35	5.18	at	5.75
December	5.25	5.25	5.35	5.00	$5.00	5.75
Average	5.25	5.25	5.22	5.31		5.75

QUALITY STEEL

for the
MANUFACTURING
and
CONSTRUCTION
INDUSTRIES

THE STEEL PRODUCING AND FINISHING FACILITIES OF LACLEDE STEEL COMPANY ARE CONSTANTLY BEING ENLARGED AND MODERNIZED TO BETTER SERVE AND MEET INCREASED DEMANDS OF INDUSTRY.

LACLEDE STEEL COMPANY
SAINT LOUIS, MISSOURI

- BLOOMS
- BILLETS
- WIRE RODS
- COLD DRAWN WIRE
- HOT ROLLED STRIP
- MERCHANT BARS AND SHAPES
- PIPE AND TUBING
- REINFORCING BARS

LACLEDE

- WIRE MESH— Rolls or Sheets
- STEEL JOISTS
- HIGHWAY DOWEL SPACERS
- HIGHWAY CENTER JOINT
- ACCESSORIES— Highway and Building

Hot-Rolled Strip at Pittsburgh
(cents per pound)

	1929	1933	1934	1935	1936	1937
January	1.80	1.45	1.75	1.85	1.85	2.15
February	1.80	1.45	1.75	1.85	1.85	2.15
March	1.80	1.45	1.75	1.85	1.85	2.35
April	1.90	1.45	1.81	1.85	1.85	2.40
May	1.90	1.49	2.00	1.85	1.85	2.40
June	1.90	1.55	2.00	1.85	1.85	2.40
July	1.90	1.60	1.88	1.85	1.95	2.40
August	1.90	1.64	1.85	1.85	1.95	2.40
September	1.97	1.68	1.85	1.85	1.95	2.40
October	1.90	1.75	1.85	1.85	1.95	2.40
November	1.90	1.75	1.85	1.85	1.95	2.40
December	1.90	1.75	1.85	1.85	2.11	2.40
Average	1.88	1.58	1.85	1.85	1.91	2.35

	1938	1939	1940		1946	1947
January	2.40	2.15	2.10		2.10	2.50
February	2.40	2.15	2.10		*2.23	2.50
March	2.40	2.15	2.10	1945	2.35	2.50
April	2.40	2.15	1.98	1944	2.35	2.50
May	2.38	2.06	2.10	1943	2.35	2.50
June	2.27	2.00	2.10	1942	2.35	2.50
July	2.15	2.00	2.10	1941 price	2.35	2.58
August	2.15	2.00	2.10	fixed	2.35	2.80
September	2.15	2.00	2.10	at	2.35	2.80
October	2.03	2.00	2.10	2.10	2.35	2.80
November	2.15	2.02	2.10		2.35	2.80
December	2.15	2.10	2.10		2.47	2.80
Average	2.25	2.08	2.09		2.33	2.63

* Over 8 in.: add 0.10c for 8 in. and under, from February through November 1946.

Cold-Rolled Strip at Pittsburgh
(cents per pound)

	1929	1933	1934	1935	1936	1937
January	2.85	1.88	2.40	2.60	2.60	2.85
February	2.85	1.80	2.40	2.60	2.60	2.85
March	2.80	1.80	2.40	2.60	2.60	3.13
April	2.75	1.80	2.50	2.60	2.60	3.20
May	2.75	1.88	2.80	2.60	2.60	3.20
June	2.75	2.00	2.80	2.60	2.60	3.20
July	2.75	2.19	2.64	2.60	2.60	3.20
August	2.75	2.25	2.60	2.60	2.60	3.20
September	2.75	2.29	2.60	2.60	2.60	3.20
October	2.75	2.40	2.60	2.60	2.60	3.20
November	2.75	2.40	2.60	2.60	2.60	3.20
December	2.75	2.40	2.60	2.60	2.80	3.20
Average	2.77	2.09	2.58	2.60	2.62	3.14

	1938	1939	1940		1946	1947
January	3.20	2.95	2.80		2.80	3.20
February	3.20	2.95	2.80		2.93	3.20
March	3.20	2.95	2.80	1945	3.05	3.20
April	3.20	2.95	2.68	1944	3.05	3.20
May	3.18	2.86	2.80	1943	3.05	3.20
June	3.07	2.80	2.80	1942	3.05	3.20
July	2.95	2.80	2.80	1941 price	3.05	3.27
August	2.95	2.80	2.80	fixed	3.05	3.55
September	2.95	2.80	2.80	at	3.05	3.55
October	2.83	2.80	2.80	2.80	3.05	3.55
November	2.95	2.80	2.80		3.05	3.55
December	2.95	2.80	2.80		3.17	3.55
Average	3.05	2.86	2.79		3.03	3.35

Bright Wire at Pittsburgh
(cents per pound)

	1929	1931	1932	1933	1934	1935
January	2.50	2.20	2.20	2.16	2.20	2.30
February	2.50	2.20	2.20	2.10	2.20	2.30
March	2.50	2.20	2.20	2.10	2.20	2.30
April	2.50	2.20	2.20	2.10	2.23	2.30
May	2.50	2.20	2.20	2.10	2.30	2.30
June	2.50	2.20	2.20	2.10	2.30	2.30
July	2.50	2.20	2.20	2.10	2.30	2.30
August	2.43	2.20	2.20	2.10	2.30	2.30
September	2.40	2.20	2.20	2.10	2.30	2.30
October	2.40	2.20	2.20	2.10	2.30	2.30
November	2.40	2.20	2.20	2.10	2.30	2.30
December	2.40	2.20	2.20	2.20	2.30	2.30
Average	2.46	2.20	2.20	2.11	2.27	2.30

	1937	1938		1945	1946	1947
January	2.60	2.90		2.60	2.75	3.30
February	2.60	2.90		2.60	2.90	3.30
March	2.84	2.90	1940	2.60	3.05	3.30
April	2.90	2.90	1943	2.60	3.05	3.30
May	2.90	2.90	1942	2.63	3.05	3.30
June	2.90	2.84	1941	2.75	3.05	3.30
July	2.90	2.60	1940 1939	2.75	3.05	3.35
August	2.90	2.60	price	2.75	3.05	3.55
September	2.90	2.60	fixed	2.75	3.05	3.55
October	2.90	2.60	at	2.75	3.05	3.55
November	2.90	2.60	2.60	2.75	3.05	3.55
December	2.90	2.60		2.75	3.10	3.55
Average	2.84	2.74		2.69	3.02	3.41

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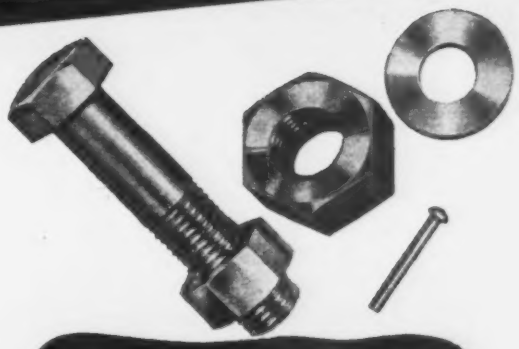

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PRICES AND PRODUCTION

Structural Shapes at Pittsburgh

(cents per pound)

	1929	1931	1932	1933	1934	1935
January	1.90	1.64	1.50	1.60	1.70	1.80
February	1.90	1.65	1.50	1.60	1.70	1.80
March	1.90	1.65	1.52	1.60	1.70	1.80
April	1.95	1.65	1.60	1.60	1.74	1.80
May	1.95	1.65	1.60	1.60	1.85	1.80
June	1.95	1.65	1.60	1.60	1.85	1.80
July	1.95	1.63	1.60	1.60	1.81	1.80
August	1.95	1.60	1.60	1.60	1.80	1.80
September	1.95	1.60	1.60	1.60	1.80	1.80
October	1.90	1.60	1.60	1.70	1.80	1.80
November	1.90	1.60	1.60	1.70	1.80	1.80
December	1.90	1.50	1.60	1.70	1.80	1.80
Average	1.92	1.62	1.57	1.68	1.78	1.80

	1936	1937	1938		1946	1947
January	1.80	2.05	2.25		2.10	2.50
February	1.80	2.05	2.25	1945	2.23	2.50
March	1.80	2.21	2.25	1944	2.35	2.50
April	1.80	2.25	2.25	1943	2.35	2.50
May	1.80	2.25	2.25	1942	2.35	2.50
June	1.80	2.25	2.22	1941	2.35	2.50
July	1.90	2.25	2.10	1940 1939	2.35	2.56
August	1.90	2.25	2.10	price	2.35	2.80
September	1.90	2.25	2.10	fixed	2.35	2.80
October	1.90	2.25	2.10	at	2.35	2.80
November	1.90	2.25	2.10	2.10	2.35	2.80
December	1.90	2.25	2.10		2.35	2.80
Average	1.85	2.21	2.17		2.32	2.63

Standard Steel Pipe at Pittsburgh

(per net ton)

Computed from list discounts, for carload lots; price for base size pipe, 1 to 3 in.; 1 in. only since August, 1947; ¾ to 3 in. prior to Apr. 13, 1931

	1929	1931	1932	1933	1934	1935
January	$70.30	$66.50	$64.84	$65.00	$61.75	$68.40
February	70.30	66.50	64.84	65.00	61.75	68.40
March	70.30	66.50	64.84	65.00	61.75	68.40
April	70.30	66.50	64.84	58.00	63.41	68.40
May	70.30	63.59	64.84	58.00	68.40	68.40
June	70.30	64.84	64.84	58.00	68.40	68.40
July	70.30	64.84	64.84	61.75	68.40	68.40
August	70.30	64.84	64.84	61.75	68.40	68.40
September	70.30	64.84	65.00	61.75	68.40	68.40
October	70.30	64.84	65.00	61.75	68.40	68.40
November	70.30	64.84	65.00	61.75	68.40	68.40
December	70.30	64.84	65.00	61.75	68.40	68.40
Average	70.30	65.29	64.89	61.63	66.32	68.40

	1936	1937	1938		1946	1947
January	$68.40	$61.00	$71.00		$63.00	$79.00
February	64.98	61.00	71.00	1945	66.00	79.00
March	61.80	69.00	71.00	1944	69.00	79.00
April	61.00	71.00	71.00	1943	69.00	79.00
May	61.00	71.00	71.00	1942	69.00	79.00
June	61.00	71.00	71.00	1941	69.00	79.00
July	61.00	71.00	63.00	1940 1939	69.00	79.00
August	61.00	71.00	63.00	price	69.00	88.00
September	61.00	71.00	63.00	fixed	69.00	88.00
October	61.00	71.00	63.00	at	69.00	88.00
November	61.00	71.00	63.00	$63.00	69.00	88.00
December	61.00	71.00	63.00		71.00	88.00
Average	62.01	69.17	67.00		68.42	82.75

High Speed Tool Steel 18-4-1

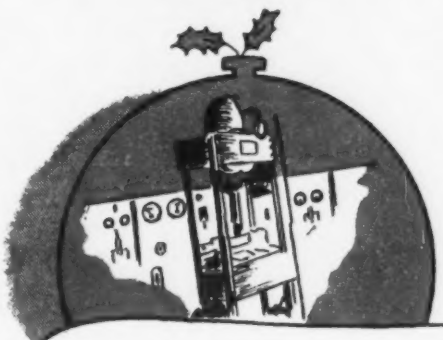
(cents per pound)

	1937		1947
January	80.00	1946*	67.00*
February	67.00	1945	67.00*
March	67.00	1944	67.00*
April	67.00	1943	74.00
May	67.00	1942	74.00
June	67.00	1941 1940	74.00
July	67.00	1939	74.00
August	67.00	1938	82.00
September	80.00	price	82.00
October	80.00	fixed	82.00
November	80.00	at	82.00
December	80.00	67.00	82.00
Average	70.10		75.58

* An increase of 8.2 pct applies to base price from Feb. 15, 1946 to Mar. 31, 1947.

Noël

and Know How



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Philadelphia, Pa.

Superior Products Co.,
Lynn, Mass.

Duramold Division,
Fairchild Engine & Airplane Co.,
Jamestown, N. Y.

Tacony Tool & Machine Co.,
Philadelphia, Pa.

Saunder Machinery Co.,
Yonkers, N. Y.

E. W. Bliss Co.,
Brooklyn, N. Y.
(Surplus Machinery)

Knott & Garlius,
Detroit, Mich.

City Forge, Co.,
Toledo, Ohio.

Roy Tool & Engineering Co.,
Detroit, Mich.

Cornell Tool Co.,
Ferndale, Mich.

Dearborn Machinery Movers,
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Toledo Millwork Co.,
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AUCTIONEERS - APPRAISERS — LIQUIDATORS

PRICES AND PRODUCTION

Steel Rails at Mill, Openhearth
(per gross ton)

	1929	1932	1933	1934	1935	1936
January	$43.00	$43.00	$40.00	$36.37	$36.37	$36.37
February	43.00	43.00	40.00	36.37	36.37	36.37
March	43.00	43.00	40.00	36.37	36.37	36.37
April	43.00	43.00	40.00	36.37	36.37	36.37
May	43.00	43.00	40.00	36.37	36.37	36.37
June	43.00	43.00	40.00	36.37	36.37	36.37
July	43.00	43.00	40.00	36.37	36.37	36.37
August	43.00	43.00	40.00	36.37	36.37	36.37
September	43.00	43.00	40.00	36.37	36.37	36.37
October	43.00	42.25	39.55	36.37	36.37	36.37
November	43.00	40.00	38.38	36.37	36.37	36.37
December	43.00	40.00	38.38	36.37	36.37	39.00
Average	43.00	42.44	39.26	36.37	36.37	36.59

	1937	1938		1945	1946	1947
January	$39.00	$42.50		$40.00	$43.00	$2.50
February	39.00	42.50		40.00	43.19	2.50
March	41.80	42.50	1944	42.25	*43.39	2.50
April	42.50	42.50	1943	43.00	43.39	2.50
May	42.50	42.50	1942	43.00	43.39	2.50
June	42.50	42.50	1941	43.00	43.39	2.50
July	42.50	42.50	1940 1939	43.00	43.39	[2.50
August	42.50	42.50	price	43.00	43.39	2.75
September	42.50	41.25	fixed	43.00	43.39	2.75
October	42.50	40.00	at	43.00	43.39	2.75
November	42.50	40.00	$40.00	43.00	43.39	2.75
December	42.50	40.00		43.00	†47.36	2.75
Average	41.88	41.77		42.44	43.67	[2.60

* Net tons, Feb. 15 to Dec. 13, 1946.
† Dollars per 100 lb since Dec. 13, 1946.

Lake Superior Iron Ores
(per gross ton, at lower Lake Erie ports)

BESSEMER ORES

	Guarantee		Price	
	Iron Natural	Phosphorus Dry	Old Range	Mesabi
1914	55.00	0.045	$3.75	$3.50
1915	55.00	0.045	3.75	3.45
1916	55.00	0.045	4.45	4.20
1917	55.00	0.045	5.95	5.70
1918 to July 1	55.00	0.045	5.95	5.70
1918-July 1 to Sept. 30	55.00	0.045	6.40	6.15
1918-Oct 1 on	55.00	0.045	6.65	6.40
1919	55.00	0.045	6.45	6.20
1920	55.00	0.045	7.45	7.20
1921	55.00	0.045	6.45	6.20
1922	55.00	0.045	5.95	5.70
1923	55.00	0.045	6.45	6.20
1924	55.00	0.045	4.65	5.40
1925 through 1928	51.50	0.045	4.55	4.40
1929 through 1936	51.50	0.045	4.80	4.65
1937 to Apr. 15, 1940	51.50	0.045	5.25	5.10
1940-Apr. 16 on	51.50	0.045	4.75	4.60
1941 through 1944	51.50	0.045	4.75	4.60
1945 to June 24, 1946	51.50	0.045	4.95	4.70
1946-June 24 to Dec. 31	51.50	0.045	5.45	5.20
1947	51.50	0.045	5.95	5.70

NON-BESSEMER ORES

	Guarantee	Price		
	Iron Natural	Old Range	Mesabi	High Phosphorus
1914	51.50	$3.00	$2.85	...
1915	51.50	3.00	2.80	...
1916	51.50	3.70	3.55	...
1917	51.50	5.20	5.05	...
1918 to July 1	51.50	5.20	5.05	...
1918-July 1 to Sept. 30	51.50	5.65	5.50	...
1918-Oct. 1 on	51.50	5.90	5.75	...
1919	51.50	5.70	5.55	$5.35
1920	51.50	6.70	6.55	6.35
1921	51.50	5.70	5.55	5.35
1922	51.50	5.20	5.05	4.85
1923	51.50	5.70	5.55	5.35
1924	51.50	4.90	4.75	4.55
1925 through 1928	51.50	4.40	4.25	4.15
1929 through 1936	51.50	4.65	4.50	4.40
1937 to Apr. 15, 1940	51.50	5.10	4.95	4.85
1940-Apr. 16 on	51.50	4.60	4.45	4.35
1941 through 1944	51.50	4.60	4.45	4.35
1945 to June 24, 1946	51.50	4.80	4.55	4.55
1946-June 24 to Dec. 31	51.50	5.30	5.05	5.05
1947	51.50	5.80	5.55	5.55

Lake Superior Iron Ore Shipments
(water movement, gross tons)

1929	1933	1934	1935
65,204,600	21,623,898	22,249,600	23,362,368
1936	1937	1938	1939
44,822,023	62,598,836	19,263,011	45,072,724
1940	1941	1942	1943
63,712,982	80,118,360	92,076,781	84,404,852
1944	1945	1946	1947
81,170,358	75,714,750	59,356,716	80,570,000

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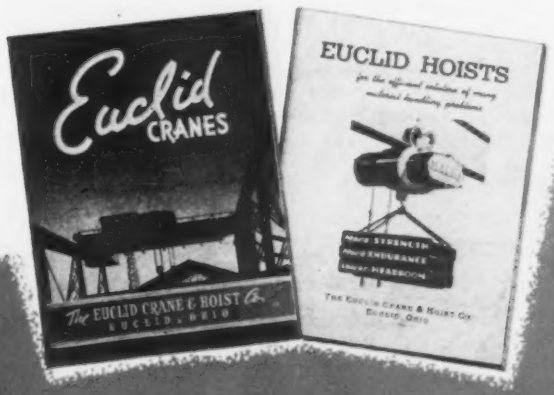

The EUCLID CRANE & HOIST Co.

1361 CHARDON RD., EUCLID, OHIO

Cast Iron Pipe at New York

(net ton, 6-in. and larger)

	1929	1932	1933	1934	1935	1936
January	$39.60	$30.20	$35.20	$43.00	$45.00	$45.20
February	39.35	29.70	35.30	43.00	45.00	45.20
March	38.60	28.40	35.30	43.00	45.00	45.20
April	37.40	28.20	35.30	43.00	45.00	45.20
May	35.85	28.20	35.30	43.00	45.00	45.20
June	35.10	28.20	38.30	44.00	45.15	45.20
July	33.20	28.73	38.30	45.00	45.20	45.90
August	33.60	31.10	38.30	45.00	45.20	45.90
September	33.60	31.30	38.30	45.00	45.20	45.90
October	34.60	33.30	38.00	45.00	45.20	45.90
November	34.60	33.30	43.00	45.00	45.20	45.90
December	34.60	34.30	43.00	45.00	45.20	47.90
Average	35.84	30.41	37.81	44.08	45.11	45.71

	1937	1938	1939		1946	1947
January	$48.00	$53.00	$49.00		$57.20	$73.80
February	48.00	53.00	49.00	1945	57.20	73.75
March	51.00	53.00	49.00	1944	60.20	76.80
April	53.00	53.00	49.00	1943	62.20	79.80
May	53.00	53.00	49.00	1942	62.20	79.80
June	53.00	52.20	49.00	1941	62.20	79.80
July	53.00	49.00	49.00	1940 price	69.60	80.50
August	53.00	49.00	49.00	fixed	69.60	83.30
September	53.00	49.00	49.00	at	69.60	83.30
October	53.00	49.00	52.20	$52.20	69.60	83.96
November	53.00	49.00	52.20		69.60	84.18
December	53.00	49.00	52.20		73.60	84.18
Average	52.00	50.93	49.80		65.23	80.25

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Composite Pig Iron Price

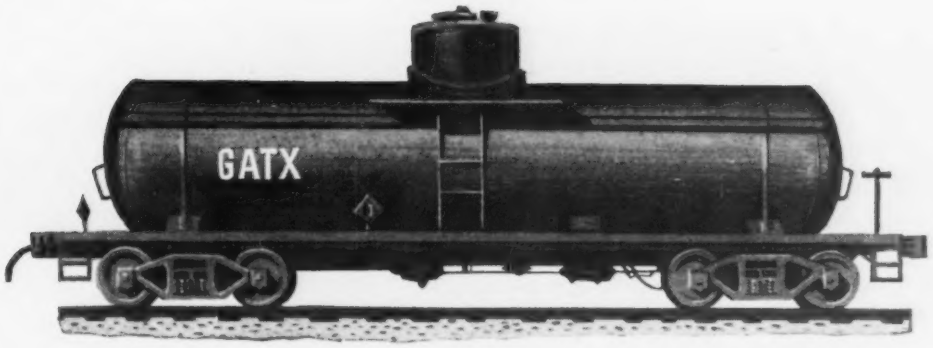
Average of THE IRON AGE quotations on basic pig iron at Valley furnaces and foundry iron at Chicago, Birmingham, Buffalo, Valley and Philadelphia, in gross tons.

	1928	1929	1930	1931	1932	1933
January	$17.63	$18.43	$18.19	$15.90	$14.88	$13.56
February	17.73	18.38	18.02	15.80	14.51	13.56
March	17.73	18.36	17.75	15.71	14.45	13.56
April	17.67	18.52	17.73	15.79	14.35	13.76
May	17.45	18.70	17.60	15.76	14.12	14.48
June	17.23	18.65	17.48	15.62	14.01	15.01
July	17.10	18.48	17.16	15.56	13.76	15.5
August	17.11	18.39	16.90	15.51	13.69	16.09
September	17.54	18.27	16.70	15.44	13.64	16.71
October	17.94	18.33	16.31	15.21	13.63	16.61
November	18.46	18.36	16.21	14.97	13.59	16.61
December	18.51	18.24	15.95	14.86	13.56	16.90
Average	17.68	18.43	17.17	15.51	14.00	15.20

	1934	1935	1936	1937	1938	1939
January	$16.90	$17.90	$18.84	$20.25	$23.25	$20.61
February	16.90	17.90	18.84	20.50	23.25	20.61
March	16.90	17.90	18.84	22.85	23.25	20.61
April	17.07	17.90	18.84	23.25	23.25	20.61
May	17.90	17.85	18.84	23.25	23.25	20.61
June	17.90	17.84	18.84	23.25	22.98	20.61
July	17.90	17.84	18.84	23.25	19.61	20.61
August	17.90	17.84	18.73	23.25	19.61	20.61
September	17.90	17.84	18.73	23.25	19.82	21.61
October	17.90	17.87	18.73	23.25	20.57	22.61
November	17.90	18.84	18.98	23.25	20.61	22.61
December	17.90	18.84	19.73	23.25	20.61	22.61
Average	17.58	18.03	18.90	22.74	21.67	21.19

	1940	1941		1945	1946	1947
January	$22.61	$23.45		$23.61	$25.37	$30.14
February	22.61	23.45		24.11	25.37	30.15
March	22.61	23.53		24.61	25.75	32.92
April	22.61	23.61	1944	24.61	26.12	33.15
May	22.61	23.61	1943	24.61	26.45	33.15
June	22.61	23.61	1942 price	24.61	28.13	33.15
July	22.61	23.61	fixed	24.61	28.13	34.52
August	22.61	23.61	at	24.61	28.13	36.84
September	22.61	23.61	$23.61	24.61	28.13	36.96
October	22.61	23.61		24.91	28.13	36.96
November	22.61	23.61		25.37	28.13	37.04
December	22.95	23.61		25.37	29.84	*37.06
Average	22.64	23.58		24.61		*34.34

*Estimate



AN IMPORTANT MESSAGE TO ALL TANK CAR SHIPPERS PLANNING EXPANSION

The demand for tank cars is so great today that many shippers are not able to meet their present transportation requirements. General American is doing everything possible to relieve this situation by producing as many cars as our supply of materials will permit.

However, we urge those of our customers who are acquiring or planning new plants to anticipate shipping requirements as many months in advance as possible. To avoid any unnecessary delay in future shipping of bulk liquids, we suggest that your traffic department check with General American on possible car availabilities well ahead of your actual needs. Consult your nearest General American district office.

GATX GENERAL AMERICAN

GENERAL AMERICAN TRANSPORTATION CORPORATION

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San Francisco • Seattle • Tulsa • Washington

PRICES AND PRODUCTION

Malleable Pig Iron at Mahoning or Shenango Valley Furnaces

(per gross ton)

	1929	1934	1935	1936	1937	1938
January	$18.00	$17.50	$18.50	$19.50	$21.00	$24.00
February	18.00	17.50	18.50	19.50	21.25	24.00
March	18.25	17.50	18.50	19.50	23.60	24.00
April	18.50	17.75	18.50	19.50	24.00	24.00
May	19.00	18.50	18.50	19.50	24.00	24.00
June	19.00	18.50	18.50	19.50	24.00	23.00
July	19.00	18.50	18.50	19.50	24.00	20.00
August	19.00	18.50	18.50	19.50	24.00	20.00
September	19.00	18.50	18.50	19.50	24.00	20.25
October	19.00	18.50	18.50	19.50	24.00	21.00
November	19.00	19.50	19.50	19.75	24.00	21.00
December	19.00	18.50	19.50	20.50	24.00	21.00
Average	18.73	18.19	18.67	19.60	23.49	22.20

	1939	1940		1945	1946	1947
January	$21.00	$23.00		$24.00	$25.75	$30.50
February	21.00	23.00		24.50	25.75	30.50
March	21.00	23.00	1944	25.00	26.13	33.50
April	21.00	23.00	1943	25.00	26.50	33.50
May	21.00	23.00	1942	25.00	26.50	33.50
June	21.00	23.00	1941	25.00	28.50	33.50
July	21.00	23.00	price fixed	25.00	28.50	34.70
August	21.00	23.00	at	25.00	28.50	36.50
September	22.00	23.00	$24.00	25.00	28.50	36.50
October	23.00	23.00		25.30	28.50	36.50
November	23.00	23.00		25.75	28.50	36.50
December	23.00	23.50		25.75	30.10	36.50
Average	21.59	23.04		25.02	27.48	34.35

Basic Pig Iron at Mahoning or Shenango Valley Furnaces

(per gross ton)

	1929	1934	1935	1936	1937	1938
January	$17.50	$17.00	$18.00	$19.00	$20.50	$23.50
February	17.50	17.00	18.00	19.00	20.75	23.50
March	17.50	17.00	18.00	19.00	23.10	23.50
April	17.90	17.25	18.00	19.00	23.50	23.50
May	18.38	18.00	18.00	19.00	23.50	23.50
June	18.50	18.00	18.00	19.00	23.50	22.70
July	18.50	18.00	18.00	19.00	23.50	19.50
August	18.50	18.00	18.00	19.00	23.50	19.50
September	18.50	18.00	18.00	19.00	23.50	19.75
October	18.50	18.00	18.00	19.00	23.50	20.50
November	18.50	18.00	19.00	19.25	23.50	20.50
December	18.50	18.00	19.00	20.00	23.50	20.50
Average	18.19	17.69	18.17	19.10	22.99	21.70

	1939	1940		1945	1946	1947
January	$20.50	$22.50		$23.50	$25.25	$30.00
February	20.50	22.50		24.00	25.25	30.00
March	20.50	22.50	1944	24.50	25.63	33.00
April	20.50	22.50	1943	24.50	26.00	33.00
May	20.50	22.50	1942	24.50	26.00	33.00
June	20.50	22.50	1941	24.50	28.00	33.00
July	20.50	22.50	price fixed	24.50	28.00	34.20
August	20.50	22.50	at	24.50	28.00	36.00
September	21.50	22.50	$23.50	24.50	28.00	36.00
October	22.50	22.50		24.80	28.00	36.00
November	22.50	22.50		25.25	28.00	36.00
December	22.50	22.90		25.25	29.60	36.00
Average	21.09	22.53		24.52	27.14	33.85

No. 2 Foundry Pig Iron at Chicago

(per gross ton, at furnace)

	1929	1934	1935	1936	1937	1938
January	$20.00	$17.50	$18.50	$19.50	$21.00	$24.00
February	20.00	17.50	18.50	19.50	21.25	24.00
March	20.00	17.50	18.50	19.50	23.60	24.00
April	20.00	17.75	18.50	19.50	24.00	24.00
May	20.00	18.50	18.50	19.50	24.00	24.00
June	20.00	18.50	18.50	19.50	24.00	23.20
July	20.00	18.50	18.50	19.50	24.00	20.00
August	20.00	18.50	18.50	19.50	24.00	20.00
September	20.00	18.50	18.50	19.50	24.00	20.25
October	20.00	18.50	18.70	19.50	24.00	21.00
November	20.00	18.50	19.50	19.75	24.00	21.00
December	20.00	18.50	19.50	20.50	24.00	21.00
Average	20.00	18.19	18.68	19.60	23.49	22.20

	1939	1940		1945	1946	1947
January	$21.00	$23.00		$24.00	$25.75	$30.50
February	21.00	23.00		24.50	25.75	30.50
March	21.00	23.00		25.00	26.13	33.00
April	21.00	23.00	1944	25.00	26.50	33.00
May	21.00	23.00	1943	25.00	26.50	33.00
June	21.00	23.00	1942	25.00	26.50	33.00
July	21.00	23.00	1941 price	25.00	28.50	34.20
August	21.00	23.00	fixed	25.00	28.50	36.00
September	22.00	23.00	at	25.00	28.50	36.00
October	23.00	23.00	$24.00	25.30	28.50	36.00
November	23.00	23.00		25.75	28.50	36.00
December	23.00	23.40		25.75	30.10	36.00
Average	21.59	23.03		25.02	27.64	33.93

PRICES AND PRODUCTION

No. 2 Foundry Pig Iron at Mahoning or Shenango Valley Furnaces

(per gross ton)

	1929	1934	1935	1936	1937	1938
January	$17.50	$17.50	$18.50	$19.50	$21.00	$24.00
February	17.50	17.50	18.50	19.50	21.25	24.00
March	17.75	17.50	18.50	19.50	23.60	24.00
April	18.00	17.75	18.50	19.50	24.00	24.00
May	18.50	18.50	18.50	19.50	24.00	24.00
June	18.50	18.50	18.50	19.50	24.00	23.20
July	18.50	18.50	18.50	19.50	24.00	20.00
August	18.50	18.50	18.50	19.50	24.00	20.00
September	18.50	18.50	18.50	19.50	24.00	20.25
October	18.50	18.50	18.50	19.50	24.00	21.00
November	18.50	18.50	19.50	19.75	24.00	21.00
December	18.50	18.50	19.50	20.50	24.00	21.00
Average	18.23	18.19	18.67	19.60	23.49	22.20

	1939	1940		1945	1946	1947
January	$21.00	$23.00		$24.00	$25.75	$30.50
February	21.00	23.00		24.50	25.75	30.50
March	21.00	23.00		25.00	26.13	33.50
April	21.00	23.00	1944	25.00	26.50	33.50
May	21.00	23.00	1943	25.00	26.50	33.50
June	21.00	23.00	1942	25.00	28.50	33.50
July	21.00	23.00	1941 price	25.00	28.50	34.70
August	21.00	23.00	fixed	25.00	28.50	36.50
September	22.00	23.00	at	25.00	28.50	36.50
October	23.00	23.00	$24.00	25.30	28.50	36.50
November	23.00	23.00		25.75	28.50	36.50
December	23.00	23.40		25.75	30.10	36.50
Average	21.59	23.03		25.02	27.64	34.35

No. 2 Foundry Pig Iron at Buffalo

(per gross ton, at furnace)

	1929	1934	1935	1936	1937	1938
January	$18.00	$17.50	$18.50	$19.50	$21.00	$24.00
February	18.39	17.50	18.50	19.50	21.25	24.00
March	18.50	17.50	18.50	19.50	23.60	24.00
April	18.50	17.50	18.50	19.50	24.00	24.00
May	18.50	18.50	18.50	19.50	24.00	24.00
June	18.75	18.50	18.50	19.50	24.00	23.20
July	19.50	18.50	18.50	19.50	24.00	20.00
August	19.50	18.50	18.50	19.50	24.00	20.00
September	19.50	18.50	18.50	19.50	24.00	20.13
October	19.50	18.50	18.50	19.50	24.00	20.88
November	19.50	18.50	19.50	19.75	24.00	21.00
December	19.50	18.50	19.50	20.50	24.00	21.00
Average	18.97	18.17	18.67	19.60	23.40	22.18

	1939	1940		1945	1946	1947
January	$21.00	$23.00		$24.00	$25.75	$30.50
February	21.00	23.00		24.50	25.75	30.50
March	21.00	23.00		25.00	26.13	32.38
April	21.00	23.00	1944	25.00	26.50	33.00
May	21.00	23.00	1943	25.00	26.50	33.00
June	21.00	23.00	1942	25.00	28.50	33.00
July	21.00	23.00	1941 price	25.00	28.50	34.20
August	21.00	23.00	fixed	25.00	28.50	*37.37
September	22.00	23.00	at	25.00	28.50	37.10
October	23.00	23.00	$24.00	25.30	28.50	37.00
November	23.00	23.00		25.75	28.50	37.75†
December	23.00	23.40		25.75	30.10	38.00†
Average	21.59	23.03		25.02	27.64	34.49†

† Estimate

*Average price including Republic Steel Co. sales based on IRON AGE weekly scrap quotations since Aug. 13.

No. 2 Foundry Pig Iron at Granite City, Ill.*

(per gross ton, at furnace)

	1929	1934	1935	1936	1937	1938
January	$20.75	$17.50	$18.50	$19.50	$21.00	$24.00
February	20.75	17.50	18.50	19.50	21.25	24.00
March	20.75	17.50	18.50	19.50	23.60	24.00
April	20.75	17.75	18.50	19.50	24.00	24.00
May	20.75	18.50	18.50	19.50	24.00	24.00
June	20.75	18.50	18.50	19.50	24.00	23.00
July	20.75	18.50	18.50	19.50	24.00	20.00
August	20.68	18.50	18.50	19.50	24.00	20.00
September	20.50	18.50	18.50	19.50	24.00	20.25
October	20.50	18.50	18.70	19.50	24.00	21.00
November	20.50	18.50	19.50	19.75	24.00	21.00
December	20.50	18.50	19.50	20.50	24.00	21.00
Average	20.66	18.19	18.68	19.60	23.49	22.29

	1939	1940		1945	1946	1947
January	$21.00	$23.00		$24.00	$25.75	$30.50
February	21.00	23.00		24.50	25.75	30.50
March	21.00	23.00	1944	25.00	26.13	32.00
April	21.00	23.00	1943	25.00	26.50	33.50
May	21.00	23.00	1942	25.00	26.50	33.50
June	21.00	23.00	1941 price	25.00	26.50	33.50
July	21.00	23.00	fixed	25.00	28.50	34.60
August	21.00	23.00	at	25.00	28.50	36.63
September	22.00	23.00	$24.00	25.00	28.50	37.00
October	23.00	23.00		25.30	28.50	37.00
November	23.00	23.00		25.75	28.50	37.00
December	23.00	23.50		25.75	29.70	37.00
Average	21.59	23.04		25.02	27.44	34.39

* Prior to September 1933, St. Louis prices are given.

PRICES AND PRODUCTION

Southern No. 2 Foundry Pig Iron* at Birmingham

(per gross ton)

	1929	1935	1936	1937	1938	1939
January	$16.50	$14.50	$15.50	$17.38	$20.38	$17.38
February	16.50	14.50	15.50	17.68	20.38	17.38
March	16.00	14.50	15.50	19.93	20.38	17.38
April	15.40	14.50	15.50	20.38	20.38	17.38
May	15.00	14.50	15.50	20.38	20.38	17.38
June	15.00	14.50	15.50	20.38	19.58	17.38
July	14.63	14.50	15.50	20.38	16.38	17.38
August	14.50	14.50	15.88	20.38	16.38	17.38
September	14.50	14.50	15.88	20.38	16.63	18.38
October	14.50	14.50	15.88	20.38	17.38	19.38
November	14.50	14.75	16.13	20.38	17.38	19.38
December	14.50	15.50	16.88	20.38	17.38	19.38
Average	15.13	14.60	15.76	19.87	18.58	17.96

	1940	1941		1945	1946	1947
January	$19.38	$19.38		$20.38	$22.13	$26.88
February	19.38	19.38		20.86	22.13	26.88
March	19.38	19.89		21.38	22.51	29.13
April	19.38	20.38	1944	21.38	22.88	29.88
May	19.38	20.38	1943	21.38	22.88	29.88
June	19.38	20.38	1942 price fixed at	21.38	24.88	29.88
July	19.38	20.38		21.38	24.88	31.28
August	19.38	20.38		21.38	24.88	34.13
September	19.38	20.38	$20.38	21.38	24.88	34.88
October	19.38	20.38		21.68	24.88	34.88
November	19.38	20.38		22.13	24.88	34.88
December	19.38	20.38		22.13	26.88	34.88
Average	19.38	20.17		21.40	24.06	31.46

* Subject to 38¢ a ton deduction for 0.70 phosphorus and over.

Lake Superior Charcoal Pig Iron at Chicago

(per gross ton)

	1929	1937	1938	1939	1940	1941
January	$27.04	$26.54	$30.24	$28.34	$30.34	$30.34
February	27.04	26.79	30.24	28.34	30.34	30.34
March	27.04	29.44	30.24	28.34	30.34	30.34
April	27.04	30.04	30.32	28.34	30.34	30.34
May	27.04	30.04	30.34	28.34	30.34	31.09
June	27.04	30.04	30.34	28.34	30.34	31.34
July	27.04	30.04	28.34	28.34	30.34	31.34
August	27.04	30.04	28.34	28.34	30.34	31.34
September	27.04	30.04	28.34	29.34	30.34	31.34
October	27.04	30.04	28.34	30.34	30.34	31.34
November	27.04	30.16	28.34	30.34	30.34	31.34
December	27.04	30.24	28.34	30.34	30.34	31.34
Average	27.04	29.45	29.31	28.92	30.34	30.99

	1942	1943	1944	1945	1946	1947
January	$31.34	$31.34	$37.34	$37.34	$42.34	$42.99
February	31.34	31.34	37.34	37.34	42.34	42.99
March	31.34	31.34	37.34	41.09	42.34	45.24
April	31.34	31.34	37.34	42.34	42.34	45.99
May	31.34	31.34	37.34	42.34	42.34	45.99
June	31.34	31.34	37.34	42.34	42.34	45.99
July	31.34	31.34	37.34	42.34	42.34	47.01
August	31.34	31.34	37.34	42.34	42.34	49.49
September	31.34	37.34	37.34	42.34	42.34	49.49
October	31.34	37.34	37.34	42.34	42.34	52.77
November	31.34	37.34	37.34	42.34	42.34	56.04
December	31.34	37.34	37.34	42.34	42.60	56.04
Average	31.34	33.34	37.34	41.40	42.38	48.34

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• • An extensive listing of additional price quotations and production statistics will be found in the regular weekly issues of THE IRON AGE.

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what's your need in SIZE?

Globe seamless steel tubing is made hot finished and cold drawn in alloy and carbon steels in sizes from ½ inch to 6⅝ inches outside diameter.

Globe seamless stainless steel tubing is available in tube sizes from ½ inch to 6⅝ inches outside diameter and in pipe sizes ⅛ inch to 6 inches, standard, extra strong and double extra strong weights.

Gloweld (electric welded) stainless steel tubing may be had in sizes ranging from ⅜ inch to 4 inches outside diameter inclusive, and in standard weight pipe sizes ⅛ inch to 2 inches, inclusive.

Your tubing needs may lie somewhere within the above ranges — whatever your requirements, Globe is qualified by experience and facilities to supply you with tubing of the quality and uniformity you demand.

GLOBE STEEL TUBES COMPANY, Milwaukee 4, Wisconsin

GLOBE TUBES

★ STAINLESS STEEL TUBES ★ PRESSURE TUBES ★ GLOBEIRON TUBING ★ GLOWELD TUBES
★ CONDENSER AND HEAT EXCHANGER TUBES ★ MECHANICAL TUBING

5025

Scrap Composite Price

Average of THE IRON AGE quotations on No. 1 heavy melting scrap at Pittsburgh, Chicago and Philadelphia, per gross ton.

	1929	1936	1937	1938	1939	1940
January	$17.02	$13.47	$18.33	$14.00	$14.94	$17.58
February	16.96	14.12	19.27	13.88	15.01	16.88
March	16.71	14.75	21.25	13.48	15.20	16.56
April	17.18	14.59	21.02	12.40	14.77	16.14
May	16.54	13.29	18.54	11.54	14.17	17.80
June	16.39	12.81	17.28	11.32	14.71	19.31
July	16.60	13.29	18.79	13.29	14.92	18.47
August	16.66	15.04	20.43	14.51	15.43	18.72
September	16.60	16.45	18.73	14.34	18.32	18.91
October	15.78	16.63	15.89	14.21	21.48	20.63
November	14.83	16.31	13.34	14.74	19.86	20.83
December	14.15	17.10	13.46	14.88	18.05	21.42
Average	16.30	14.83	18.03	13.54	16.39	18.67

	1941		1944	1945	1946	1947
January	$20.88		$19.17	$19.17	$19.17	$31.00
February	20.08		19.17	19.17	19.17	33.31
March	20.29		19.17	19.17	19.17	38.65
April	19.22	1943	19.17	19.17	19.17	33.85
May	19.17	1942	19.17	19.05	19.17	29.81
June	19.17	price fixed	19.17	19.00	19.17	32.79
July	19.17	at	19.17	19.17	19.17	37.95
August	19.17	$19.17	19.10	19.17	19.17	39.48
September	19.17		17.87	19.17	19.17	37.77
October	19.17		15.87	19.17	19.17	40.50
November	19.17		16.54	19.17	23.34	41.21
December	19.17		19.04	19.17	28.23	40.00*
Average	19.49		18.55	19.15	20.27	38.38

*Estimate

No. 1 Heavy Melting Scrap at Pittsburgh
(per gross ton)

	1929	1936	1937	1938	1939	1940
January	$19.31	$14.44	$19.50	$14.25	$15.72	$18.38
February	18.63	14.96	19.81	14.13	15.72	17.50
March	18.44	15.75	23.15	13.67	15.97	16.88
April	18.60	15.75	22.25	12.44	15.31	16.55
May	17.88	14.50	19.38	11.50	14.48	18.37
June	18.25	13.57	18.45	11.30	15.12	20.06
July	18.55	14.19	19.75	14.25	15.58	19.10
August	19.00	15.94	21.85	15.45	16.15	18.56
September	18.31	17.80	19.62	15.25	19.88	20.00
October	17.30	17.87	16.62	15.00	23.05	21.45
November	16.39	17.31	13.75	15.28	20.58	21.89
December	15.45	18.31	13.75	15.75	18.58	22.28
Average	18.01	15.87	18.88	14.02	17.17	19.23

	1941		1944	1945	1946	1947
January	$22.13		$20.00	$20.00	$20.00	$32.25
February	21.00		20.00	20.00	20.00	34.94
March	21.00		20.00	20.00	20.00	39.85
April	20.20	1943	20.00	20.00	20.00	35.40
May	20.00	1942	20.00	20.00	20.00	30.38
June	20.00	price fixed	20.00	20.00	20.00	33.88
July	20.00	at	20.00	20.00	20.00	38.45
August	20.00	$20.00	19.95	20.00	20.00	40.00
September	20.00		18.25	20.00	20.00	37.75
October	20.00		16.10	20.00	20.00	40.75
November	20.00		17.13	20.00	23.94	41.88
December	20.00		19.94	20.00	29.00	40.00*
Average	20.36		19.28	20.00	21.08	37.13*

*Estimate

No. 1 Heavy Melting Scrap at Chicago
(per gross ton)

	1929	1936	1937	1938	1939	1940
January	$15.39	$13.37	$17.81	$13.00	$13.87	$16.38
February	15.88	14.19	19.25	12.69	13.94	15.75
March	15.66	14.75	20.60	12.15	14.25	15.69
April	15.95	14.34	20.56	11.37	13.37	15.33
May	15.39	12.87	17.12	11.00	12.75	17.00
June	14.94	12.85	15.70	10.45	13.45	18.19
July	14.75	13.37	17.62	12.00	13.50	17.35
August	15.06	15.19	19.70	13.75	13.87	18.03
September	15.13	16.15	17.56	13.50	16.22	19.22
October	14.30	16.25	14.69	12.88	19.16	19.75
November	13.15	16.50	12.50	14.20	17.85	20.06
December	12.50	17.00	12.38	13.75	16.67	20.60
Average	14.84	14.74	17.12	12.56	14.91	17.73

	1941		1944	1945	1946	1947
January	$20.00		$18.75	$18.75	$18.75	$29.75
February	19.25		18.75	18.75	18.75	31.63
March	19.88		18.75	18.75	18.75	36.69
April	18.95	1943	18.75	18.75	18.75	33.05
May	18.75	1942	18.75	18.75	18.75	29.38
June	18.75	price fixed	18.75	18.75	18.75	30.88
July	18.75	at	18.75	18.75	18.75	36.97
August	18.75	$18.75	18.75	18.75	18.75	39.88
September	18.75		18.69	18.75	18.75	38.75
October	18.75		18.90	18.75	18.75	40.50
November	18.75		17.00	18.75	23.13	39.13
December	18.75		18.69	18.75	27.25	38.75*
Average	19.01		18.27	18.75	19.87	35.48*

*Estimate

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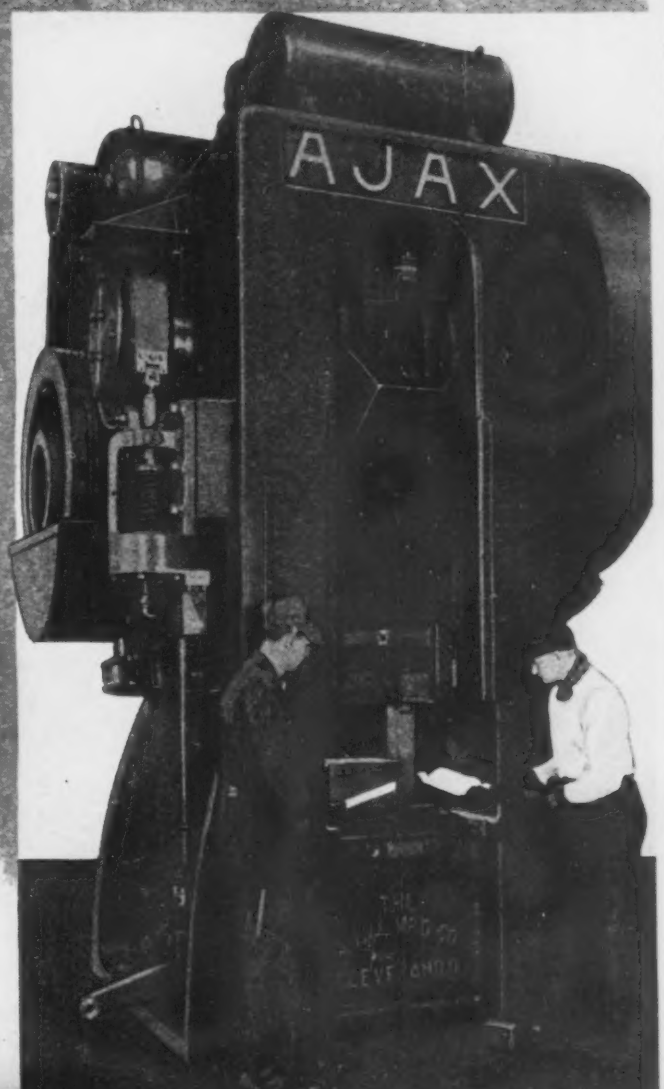

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DEWART BUILDING NEW LONDON, CONN.

PRICES AND PRODUCTION

No. 1 Heavy Melting Scrap at Philadelphia
(per gross ton)

	1929	1936	1937	1938	1939	1940
January	$16.39	$12.62	$17.37	$14.75	$15.25	$18.00
February	16.39	13.25	18.50	14.75	15.25	17.38
March	16.13	13.75	19.60	14.55	15.38	17.12
April	17.00	13.69	20.00	13.37	15.62	16.75
May	16.39	12.81	18.62	12.13	15.25	17.56
June	16.00	12.00	17.20	12.20	15.41	19.69
July	16.50	12.31	19.00	13.63	15.62	18.95
August	16.50	14.00	19.75	14.35	18.25	19.56
September	16.39	15.40	19.00	14.25	18.87	20.50
October	15.70	15.75	16.38	14.75	22.35	20.70
November	15.00	15.12	13.75	14.75	20.75	20.75
December	14.50	15.50	14.25	15.12	18.92	20.85
Average	16.07	13.85	17.78	14.05	17.08	18.98

	1941		1944	1945	1946	1947
January	$20.50		$18.75	$18.75	$18.75	$31.00
February	20.00		18.75	18.75	18.75	33.38
March	20.00		18.75	18.75	18.75	39.38
April	19.00	1943	18.75	18.75	18.75	33.10
May	18.75	1942	18.75	18.40	18.75	29.69
June	18.75	price fixed	18.75	18.25	18.75	33.63
July	18.75	at	18.75	18.75	18.75	38.45
August	18.75	$18.75	18.60	18.75	18.75	38.50
September	18.75		16.86	18.75	18.75	36.80
October	18.75		14.60	18.75	18.75	40.25
November	18.75		15.50	18.75	22.94	42.63
December	18.75		18.50	18.75	28.00	41.10*
Average	19.13		17.01	18.68	19.87	36.50*

*Estimate

No. 1 Machinery Cast Scrap at Cincinnati
(per gross ton)

	1929	1934	1935	1936	1937	1938
January	$17.14	$9.50	$10.25	$11.37	$15.75	$11.25
February	17.24	9.50	9.94	11.75	16.12	10.67
March	17.19	10.00	9.19	12.40	17.30	11.05
April	17.19	10.00	8.75	12.19	17.37	10.82
May	17.19	9.45	8.87	11.50	14.44	10.25
June	17.19	9.00	9.06	11.20	14.00	10.10
July	17.19	9.00	9.10	11.19	14.87	11.75
August	17.05	8.88	9.94	12.43	16.25	12.65
September	16.98	8.75	10.00	13.60	14.25	12.31
October	16.92	8.75	10.50	14.00	13.38	12.31
November	16.57	8.88	10.50	14.00	11.85	13.15
December	16.52	9.85	10.90	15.12	10.75	13.88
Average	17.03	9.30	9.75	12.56	14.69	11.68

	1939	1940	1941†		1946	1947
January	$13.75	$17.65	$22.75		$20.00	$34.00
February	13.75	16.69	22.50		20.00	35.38
March	14.38	16.25	*22.50		20.00	47.00
April	13.56	16.05	....	1945†	20.00	45.60
May	12.00	16.88	....	1944	20.00	43.25
June	12.13	19.38	....	1943	20.00	44.88
July	12.25	18.65	....	1942 price	20.00	46.50
August	12.80	18.75	....	fixed	20.00	45.50
September	15.38	20.12	*22.50	at	22.50	44.50
October	19.55	20.55	22.50	$20.00	25.00	45.50
November	18.88	21.00	22.50		26.25	50.38
December	17.75	22.50	22.50		30.80	53.60*
Average	14.68	18.71	....		22.05	44.67*

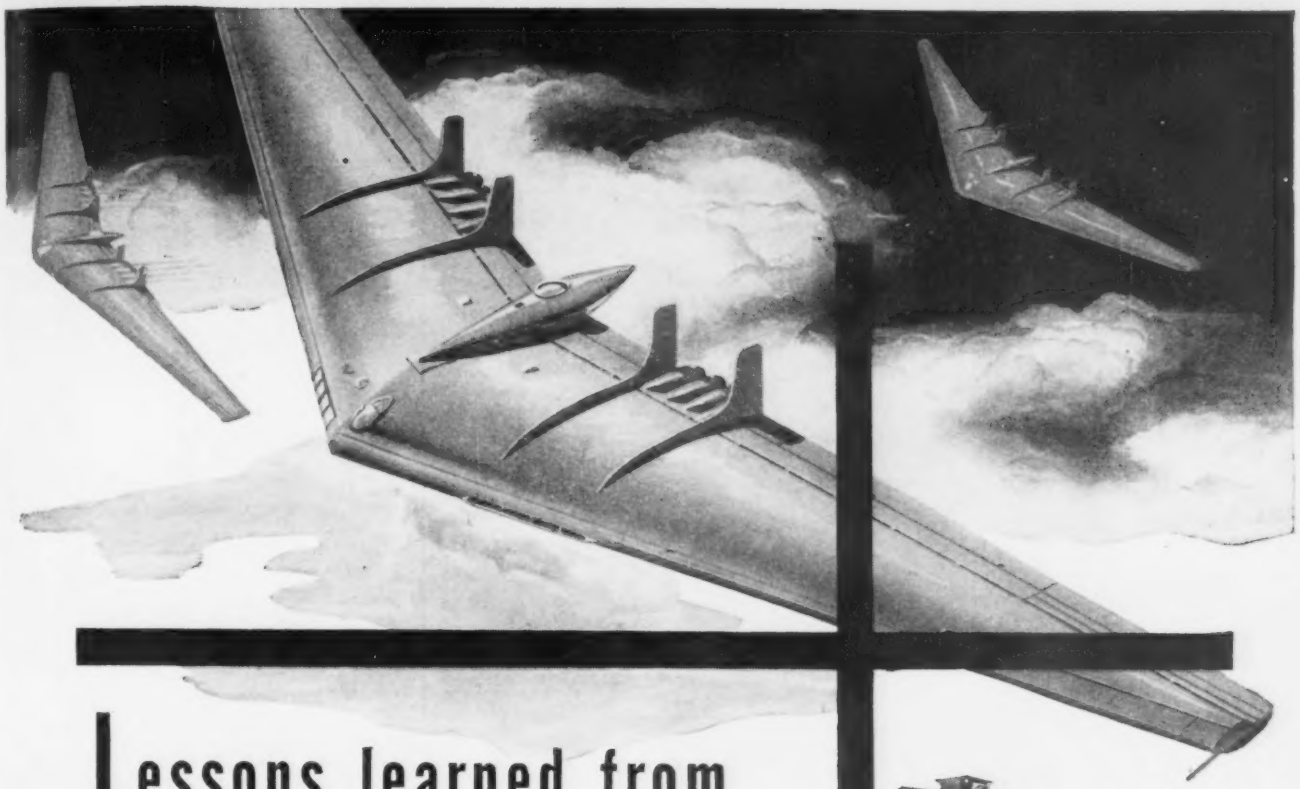
*Estimate

* In transition from open market quotations to OPA price maximums, this grade not quoted. However, in September, the maximum schedules were revised to include this grade.

† Ceiling price does not include delivery costs.

Magnesium, 99.8 Pct Plus
(cents per pound, freight allowed; f. o. b. Freeport, Tex., since Dec. 1, 1947)

1929	56.00	1935	30.00
1930	48.00	1936	30.00
1931	34.00	1937	30.00
1932	29.00	1938	30.00
1933	28.00	1939	27.00
1934	26.00	1940	27.00
1941	27.00
1942	22.50
1943 through 1947	20.50



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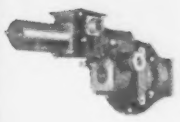

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FOOTE BROS.

Better Power Transmission Through Better Gears

PRICES AND PRODUCTION

No. 1 Machinery Cast Scrap at Chicago

(per gross ton‡)

	1929	1934	1935	1936	1937	1938
January	$15.81	$9.50	$10.60	$12.00	$15.87	$12.50
February	16.25	9.50	10.00	12.75	16.25	12.19
March	16.00	9.50	9.38	13.10	17.40	11.65
April	16.00	9.50	9.00	12.50	17.12	10.88
May	15.39	8.90	9.00	12.00	15.25	10.75
June	14.75	7.50	9.00	12.00	15.00	10.45
July	14.50	8.05	9.30	12.12	15.75	12.00
August	14.50	8.00	10.87	13.37	16.55	13.38
September	14.50	8.00	11.29	13.60	14.38	13.00
October	14.50	8.00	11.25	14.00	13.18	12.25
November	13.63	8.25	11.50	14.00	11.85	12.60
December	13.50	9.65	11.80	14.75	12.12	12.50
Average	15.11	8.69	10.24	13.02	15.04	12.01

	1939	1940	1941†		1946	1947
January	$12.56	$14.00	$18.88		$20.00	$43.38
February	12.75	13.75	19.25		20.00	44.56
March	12.75	13.56	20.75		20.00	48.00
April	12.12	14.81	*22.33	1945†	20.00	42.70
May	11.75	16.31	21.40	1944	20.00	38.00
June	12.15	17.31	20.00	1943	20.00	41.81
July	12.25	16.75	20.00	1942 price	20.00	46.00
August	12.25	16.88	20.00	fixed	20.00	49.38
September	14.50	17.13	20.00	at	22.50	49.50
October	16.87	17.75	20.00	$20.00	25.00	51.00
November	15.65	18.00	20.00		32.28	52.75
December	14.50	19.13	20.00		41.05	60.30
Average	13.34	16.28	20.21		23.40	47.12*

*Estimate

‡ Changed from net ton basis Apr. 30, 1941.
† Ceiling price does not include delivery costs.

Furnace Coke, Connellsville

(net ton at oven)

	1929	1937	1938	1939	1940	1941
January	$2.75	$4.00	$4.00	$3.75	$4.20	$5.50
February	2.90	4.06	4.00	3.75	4.00	5.50
March	2.98	4.25	4.00	3.75	4.00	5.52
April	2.78	4.51	4.00	3.75	4.00	5.63
May	2.75	4.60	4.00	3.75	4.00	6.00
June	2.75	4.58	3.85	3.75	4.00	6.13
July	2.75	4.35	3.75	3.75	4.20	6.13
August	2.73	4.35	3.75	3.75	4.63	6.13
September	2.65	4.27	3.75	4.25	4.75	6.13
October	2.65	4.25	3.75	4.90	4.75	6.13
November	2.65	4.25	3.75	5.00	5.10	6.13
December	2.63	4.00	3.75	5.00	5.38	6.13
Average	2.75	4.29	3.88	4.09	4.42	5.92

	1942	1943	1944	1945	1946	1947
January	$6.13	$6.00	$7.00	$7.00	$7.50	$8.75
February	6.00	6.25	7.00	7.00	7.50	8.88
March	6.00	6.50	7.00	7.00	7.50	9.00
April	6.00	6.50	7.00	7.00	7.50	9.66
May	6.00	6.50	7.00	7.15	7.50	10.50
June	6.00	6.50	7.00	7.50	7.50	10.50
July	6.00	6.50	7.00	7.50	8.50	11.40
August	6.00	6.50	7.00	7.50	8.75	12.00
September	6.00	6.50	7.00	7.50	8.75	12.00
October	6.00	6.50	7.00	7.50	8.75	12.38
November	6.00	6.50	7.00	7.50	8.75	12.50
December	6.00	6.50	7.00	7.50	8.75	12.50
Average	6.01	6.45	7.00	7.30	8.10	10.83

Foundry Coke, Connellsville

(net ton at oven)

	1929	1937	1938	1939	1940	1941
January	$3.75	$4.50	$5.00	$4.75	$5.50	$5.75
February	3.75	4.50	5.00	4.75	5.31	5.75
March	3.75	4.50	5.00	4.75	5.25	5.85
April	3.75	5.00	5.00	4.75	5.25	5.62
May	3.75	5.25	5.00	4.75	5.25	6.72
June	3.75	5.25	4.85	4.75	5.25	6.88
July	3.75	5.00	4.75	4.75	5.25	6.88
August	3.75	5.00	4.75	4.75	5.25	6.88
September	3.75	5.00	4.75	5.12	5.25	6.88
October	3.75	5.00	4.75	5.65	5.25	6.88
November	3.75	5.00	4.75	5.75	5.68	6.88
December	3.50	5.00	4.75	5.75	5.75	6.88
Average	3.73	4.92	4.86	5.02	5.35	6.49

	1942	1943	1944	1945	1946	1947
January	$6.88	$6.88	$8.06	$8.25	$9.00	$8.50
February	6.88	7.13	8.25	8.25	9.00	9.38
March	6.88	7.38	8.25	8.25	9.00	10.25
April	6.88	7.38	8.25	8.25	9.00	10.65
May	6.88	7.44	8.25	8.47	9.00	11.25
June	6.88	7.50	8.25	9.00	9.00	11.25
July	6.88	7.50	8.25	9.00	9.68	12.75
August	6.88	7.50	8.25	9.00	8.50	13.75
September	6.88	7.50	8.25	9.00	8.50	13.75
October	6.88	7.50	8.25	9.00	8.50	13.94
November	6.88	7.50	8.25	9.00	8.50	14.00
December	6.88	7.50	8.25	9.00	8.50	14.00
Average	6.88	7.39	8.24	8.71	8.85	11.96

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PRICES AND PRODUCTION

Electrolytic Copper, Conn. Valley
(cents per pound)

	1929	1933	1934	1935	1936	1937
January	16.84	5.00	8.18	9.00	9.25	12.86
February	18.05	5.00	8.00	9.00	9.25	13.60
March	21.38	5.26	8.00	9.00	9.25	15.99
April	19.93	5.68	8.39	9.00	9.40	15.35
May	18.00	6.93	8.50	9.00	9.50	14.00
June	18.00	8.00	8.82	8.88	9.50	14.00
July	18.00	8.91	9.00	8.00	9.60	14.00
August	18.00	9.00	9.00	8.22	9.75	14.00
September	18.03	9.00	9.00	8.77	9.75	13.78
October	18.00	8.25	9.00	9.19	9.85	12.06
November	18.00	8.16	9.00	9.25	10.43	11.02
December	18.00	8.12	9.00	9.25	11.00	10.24
Average	18.35	7.28	8.66	8.88	9.71	13.39

	1938	1939	1940		1946	1947
January	10.42	11.25	12.22		12.00	19.56
February	10.00	11.25	11.40		12.00	19.75
March	10.00	11.25	11.38	1945	12.00	21.50
April	10.00	10.47	11.33	1944	12.00	21.50
May	9.60	10.06	11.32	1943	12.00	22.63
June	9.00	10.00	11.37	1942	14.28	21.63
				1941		
July	9.81	10.22	10.81	price	14.375	21.50
August	10.12	10.49	10.95	fixed	14.375	21.50
September	10.25	11.93	11.54	at	14.375	21.50
October	10.98	12.44	12.00	12.00	14.375	21.50
November	11.25	12.50	12.00		17.19	21.50
December	11.25	12.50	12.00		19.50	21.50
Average	10.22	11.20	11.53		14.04	21.30

Zinc at New York
(cents per pound)

	1929	1934	1935	1936	1937	1938
January	6.70	4.62	4.08	5.22	6.20	5.35
February	6.70	4.73	4.06	5.23	6.80	5.17
March	6.80	4.72	4.25	5.27	7.75	4.77
April	7.04	4.72	4.38	5.27	7.70	4.53
May	6.98	4.71	4.60	5.27	7.10	4.43
June	7.00	4.59	4.67	5.26	7.10	4.53
July	7.10	4.68	4.70	5.18	7.27	5.14
August	7.15	4.63	4.92	5.17	7.56	5.14
September	7.15	4.43	5.04	5.22	7.54	5.24
October	7.09	4.19	5.21	5.22	6.45	5.40
November	6.63	4.08	5.23	5.35	5.98	5.12
December	6.09	4.06	5.22	5.64	5.36	4.89
Average	6.87	4.51	4.70	5.27	6.90	4.98

	1939	1940	1941		1946	1947
January	4.89	6.03	7.65		8.65	11.005
February	4.89	5.93	7.65		8.65	11.005
March	4.89	6.14	7.65		8.65	11.005
April	4.89	6.14	7.65	1945	8.65	11.005
May	4.89	6.20	7.65	1944	8.65	11.005
June	4.89	6.63	7.65	1943	8.65	11.005
				1942		
July	4.91	6.64	7.65	price	8.69	11.005
August	5.11	6.79	7.65	fixed	8.69	11.005
September	6.51	7.33	7.65	at	8.69	11.005
October	6.89	7.64	8.36	8.65	9.28	11.03
November	6.89	7.64	8.65		10.86	11.06
December	6.46	7.65	8.65		10.94	11.06
Average	5.51	6.73	7.88		9.09	11.02

Aluminum, 99 Pct Plus
(cents per pound, freight allowed)

	1929	1932	1933	1934	1935	1936
January	23.90	23.30	23.30	23.30	20.50	20.50
February	23.90	23.30	23.30	21.65	20.50	20.50
March	23.90	23.30	23.30	21.65	20.50	20.50
April	23.90	23.30	23.30	21.65	20.50	20.50
May	23.90	23.30	23.30	21.65	20.50	20.50
June	23.90	23.30	23.30	21.65	20.50	20.50
July	23.90	23.30	23.30	21.65	20.50	20.50
August	23.90	23.30	23.30	21.65	20.50	20.50
September	23.90	23.30	23.30	21.65	20.50	20.50
October	23.90	23.30	23.30	21.49	20.50	20.50
November	23.90	23.30	23.30	20.50	20.50	20.50
December	23.90	23.30	23.30	20.50	20.50	20.50
Average	23.90	23.30	23.30	21.58	20.50	20.50

	1937	1938	1939	1940	1941	
January	20.50	20.00	20.00	20.00	17.00	
February	20.50	20.00	20.00	20.00	17.00	1947
March	20.00	20.00	20.00	20.00	17.00	1946
April	20.00	20.00	20.00	19.00	17.00	1945
May	20.00	20.00	20.00	19.00	17.00	1944
June	20.00	20.00	20.00	19.00	17.00	1943
						1942
July	20.00	20.00	20.00	19.00	17.00	price
August	20.00	20.00	20.00	18.00	17.00	fixed
September	20.00	20.00	20.00	18.00	17.00	at
October	20.00	20.00	20.00	18.00	15.00	15.00
November	20.00	20.00	20.00	17.50	15.00	
December	20.00	20.00	20.00	17.00	15.00	
Average	20.08	20.00	20.00	18.71	16.50	

"take it" from Chief Keokuk...

"Blue Ribbon" Winner

... that's KEOKUK Electro-Silvery

STEEL PLANTS

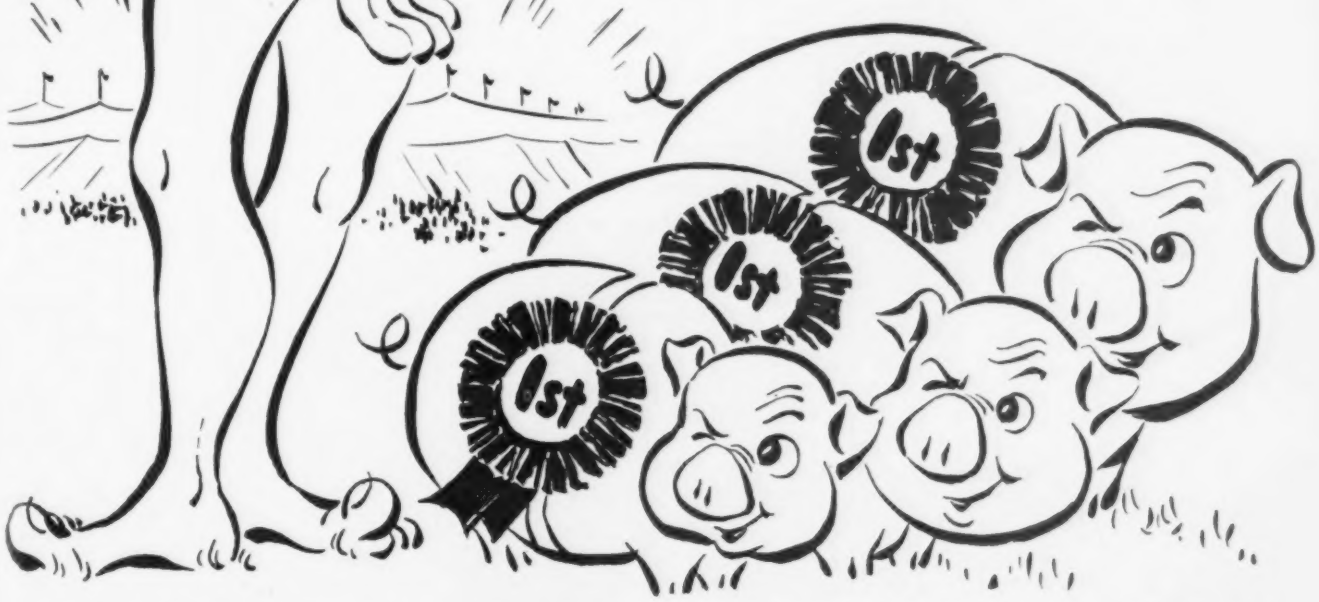
60-pound Keokuk Electro-Silvery Pigs for blocking the open hearth heat. For equal distribution of silicon and best temperature melt-down. Handle by magnet.

FOUNDRIES

30-pound Keokuk Electro-Silvery Pigs for charging mechanically or by hand into the cupola. Easily broken into two or more pieces, handled by magnet and measured by weight. Regular or alloy analysis.

12½-pound Keokuk Electro-Silvery Piglets so uniform in weight that they may be charged into the cupola by count, eliminating weighing operations. Handle by magnet. Regular or alloy analysis.

Write today for complete information.



KEOKUK ELECTRO-METALS COMPANY

KEOKUK, IOWA

Sales Agents: MILLER AND COMPANY, 332 S. MICHIGAN AVENUE, Chicago 4, Illinois
CINCINNATI 2, OHIO, 3504 CAREW TOWER • ST. LOUIS 1, MISSOURI, 407 N. EIGHTH ST.

PRICES AND PRODUCTION

Lead at New York

(cents per pound)

	1929	1934	1935	1936	1937	1938
January	6.65	4.00	3.69	4.50	6.00	4.87
February	6.85	4.00	3.53	4.51	6.23	4.83
March	7.41	4.00	3.58	4.60	7.19	4.50
April	7.19	4.18	3.69	4.60	6.32	4.50
May	7.00	4.14	3.96	4.60	6.00	4.40
June	7.00	3.98	4.02	4.60	6.00	4.15
July	6.80	3.77	4.12	4.60	6.00	4.88
August	6.75	3.75	4.25	4.60	6.45	4.90
September	6.88	3.68	4.41	4.60	6.40	5.00
October	6.87	3.65	4.51	4.63	5.75	5.10
November	6.29	3.57	4.50	5.11	5.03	5.09
December	6.25	3.60	4.50	5.55	4.87	4.84
Average	6.83	3.86	4.06	4.71	6.02	4.74

	1939	1940	1941		1946	1947
January	4.83	5.47	5.50		6.50	13.00
February	4.80	5.08	5.60		6.50	13.25
March	4.82	5.19	5.77		6.50	15.00
April	4.78	5.07	5.85	1945	6.50	15.00
May	4.75	5.02	5.85	1944	6.50	15.00
June	4.80	5.00	5.85	1943	8.18	15.00
July	4.85	5.00	5.85	1942 price	9.18	15.00
August	5.04	4.85	5.85	fixed	8.25	15.00
September	5.45	4.93	5.85	at	8.25	15.00
October	5.50	5.31	5.85	6.50	8.25	15.00
November	5.50	5.73	5.85		10.41	15.00
December	5.50	5.50	5.85		12.20	15.00
Average	5.05	5.18	5.79		8.10	14.89

Straits Tin at New York

(cents per pound)

	1929	1934	1935	1936	1937	1938
January	49.21	51.98	50.91	47.23	50.90	41.54
February	49.39	51.78	49.99	47.94	52.10	41.23
March	48.85	53.84	46.88	48.00	52.74	41.16
April	45.93	55.66	50.05	46.97	59.02	38.41
May	43.88	53.57	51.10	48.31	55.64	36.83
June	44.20	51.31	51.08	42.24	55.88	40.36
July	46.29	51.94	52.31	42.96	59.34	43.38
August	46.60	51.99	50.46	42.57	59.40	43.26
September	45.32	51.52	49.05	44.77	58.84	43.40
October	42.25	51.01	51.25	44.95	51.52	45.25
November	40.18	51.24	51.88	51.30	43.34	46.29
December	39.87	50.92	49.77	51.85	42.96	46.21
Average	45.16	52.23	50.39	46.42	54.29	42.28

	1939	1940	1941		1946	1947
January	46.39	46.73	50.16		52.00	70.00
February	45.64	45.85	51.41		52.00	70.00
March	46.17	47.07	52.07		52.00	70.00
April	47.16	46.96	52.03	1945	52.00	80.00
May	49.00	51.51	52.18	1944	52.00	80.00
June	48.81	54.64	52.68	1943	52.00	80.00
July	48.53	51.81	53.41	1942 price	52.00	80.00
August	48.80	51.21	52.45	fixed	52.00	80.00
September	Nom.	50.30	52.00	at	52.00	80.00
October	55.68	51.50	52.00	52.00	52.00	80.00
November	52.65	50.57	52.00		61.00	80.00
December	51.40	50.11	52.00		70.00	88.80
Average	49.11	49.84	52.03		54.00	77.87

50 Pct Ferrosilicon

(carloads, per gross ton, delivered East of Mississippi River)

	1929	1936	1937	1938	1939	1940
January	$83.50	$77.50	$69.50	$69.50	$69.50	$69.50
February	83.50	77.50	69.50	69.50	69.50	69.50
March	83.50	77.50	69.50	69.50	69.50	69.50
April	83.50	77.50	69.50	69.50	69.50	69.50
May	83.50	77.50	69.50	69.50	69.50	69.50
June	83.50	77.50	69.50	69.50	69.50	72.00
July	83.50	69.50	69.50	69.50	69.50	74.50
August	83.50	69.50	69.50	69.50	69.50	74.50
September	83.50	69.50	69.50	69.50	69.50	74.50
October	83.50	69.50	69.50	69.50	69.50	74.50
November	83.50	69.50	69.50	69.50	69.50	74.50
December	83.50	69.50	69.50	69.50	69.50	74.50
Average	83.50	73.50	69.50	69.50	69.50	72.11

		1943	1944*	1945*	1946*	1947
January		$74.50	6.65¢	6.65¢	6.65¢	7.45¢
February		74.50	6.65	6.65	6.65	7.45
March		74.50	6.65	6.65	6.65	7.45
April		74.50	6.65	6.65	6.65	7.80
May	1942	74.50	6.65	6.65	6.65	7.80
June	1941 price	74.50	6.65	6.65	6.65	7.80
July	fixed	6.65¢*	6.65	6.65	7.05	7.80
August	at	6.65	6.65	6.65	7.05	7.80
September	$74.50	6.65	6.65	6.65	7.05	7.80
October		6.65	6.65	6.65	7.05	8.80
November		6.65	6.65	6.65	7.05	8.80
December		6.65	6.65	6.65	7.05	9.18
Average		6.65	6.65	6.65	6.85	7.99

* Cents per lb of contained Si.

Ferromanganese, 80 Pct

(carloads, per gross ton, at seaboard)

	1929	1934	1935	1936	1937	1938
January	$105.00	$85.00	$85.00	$75.00	$80.00	$102.50
February	105.00	85.00	85.00	75.00	80.00	102.50
March	105.00	85.00	85.00	75.00	89.00	102.50
April	105.00	85.00	85.00	75.00	95.00	102.50
May	105.00	85.00	85.00	75.00	100.62	102.50
June	105.00	85.00	85.00	75.00	102.50	102.50
July	105.00	85.00	85.00	75.00	102.50	92.50
August	105.00	85.00	85.00	75.00	102.50	92.50
September	105.00	85.00	85.00	75.00	102.50	92.50
October	105.00	85.00	85.00	75.00	102.50	92.50
November	105.00	85.00	85.00	80.00	102.50	92.50
December	105.00	85.00	85.00	80.00	102.50	92.50
Average	105.00	85.00	85.00	75.83	96.84	97.50

	1939	1940	1941	1942		1947
January	$85.00	$100.00	$120.00	$120.00		$135.00
February	80.00	100.00	120.00	120.00		135.00
March	80.00	100.00	120.00	120.00	1946	135.00
April	80.00	100.00	120.00	120.00	1945	135.00
May	80.00	100.00	120.00	135.00	1944	135.00
June	80.00	110.00	120.00	135.00	1943	135.00
July	80.00	120.00	120.00	135.00	price fixed	135.00
August	80.00	120.00	120.00	135.00	at	135.00
September	95.00	120.00	120.00	135.00	$135.00	135.00
October	100.00	120.00	120.00	135.00		145.00
November	100.00	120.00	120.00	135.00		145.00
December	100.00	120.00	120.00	135.00		145.00
Average	86.67	110.84	120.00	130.00		137.50

Spiegeleisen, 19 to 21 Pct

(carloads, per gross ton, Palmerton, Pa.)

	1929	1933	1934	1935	1936	1937
January	$31.00	$24.00	$27.00	$26.00	$26.00	$26.00
February	31.00	24.00	27.00	26.00	26.00	26.00
March	31.00	24.00	26.50	26.00	26.00	28.40
April	31.00	24.00	26.00	26.00	26.00	30.00
May	31.00	24.00	24.00	26.00	26.00	32.25
June	31.00	24.00	26.00	26.00	26.00	33.00
July	31.00	27.00	26.00	26.00	26.00	33.00
August	31.00	27.00	26.00	26.00	26.00	33.00
September	31.00	27.00	26.00	26.00	26.00	33.00
October	31.00	27.00	26.00	26.00	26.00	33.00
November	31.00	27.00	26.00	26.00	26.00	33.00
December	31.00	27.00	26.00	26.00	26.00	33.00
Average	31.00	25.50	26.21	26.00	26.00	31.14

	1938	1939	1940		1946	1947
January	$33.00	$28.00	$32.00		$36.00	$40.00
February	33.00	28.00	32.00		36.00	40.00
March	33.00	28.00	32.00	1945	36.00	42.00
April	33.00	28.00	32.00	1944	36.00	44.00
May	33.00	28.00	32.00	1943	36.00	44.00
June	33.00	28.00	34.40	1942	36.00	44.00
July	28.00	28.00	36.00	1941 price fixed	36.00	44.00
August	28.00	28.00	36.00	at	36.00	46.25
September	28.00	31.00	36.00	at	36.00	47.00
October	28.00	32.00	36.00	$36.00	36.00	47.00
November	28.00	32.00	36.00		38.00	47.00
December	28.00	32.00	36.00		40.00	47.00
Average	30.50	29.25	34.20		36.50	44.35

Employees Receive Bonus

Detroit

• • • **Under the terms** of an agreement with the UAW-CIO, Kaiser-Frazer Corp. will pay $748,665 to 10,200 employees at the Willow Run plant.

Average payment for 1947 will be $72.16, and the highest check to production workers will total $92.77. Last year individual checks ranged up to $41.82.

Under the terms of the K-F bonus security trust fund, the plant distributes $5 for each Kaiser and Frazer automobile produced and $1 for each Roto-tiller.

Who Sells It

(CONTINUED FROM PAGE 209)

Adsorbents, Oil and Grease

Safety & Maintenance Co., Inc., 601 W. 26th St., New York 1.

Agitators

Alsop Engineering Corp., Milldale, Conn.

Beam-Knodel Co., 195 Lafayette St., New York 12.

The Bonnot Company, 722 Mulberry Rd. S. E., Canton 2.

Condenser Service & Engineering Co., Inc., 95 River St., Hoboken, N. J.

Enthone, Inc., 442 Elm St., New Haven 11, Conn.

Hauser Stander Tank Co., Spring Grove Ave. & Salway St., Cincinnati 32.

Heil Process Equipmnt Corp., 12901 Elmwood Ave., Cleveland 11.

International Engineering, Inc., Dayton.

H. K. Porter Co., Inc., Oliver Bldg., Pittsburgh.

The Ruthman Machinery Co., 1809-1823 Reading Rd., Cincinnati 2.

F. L. Smidth & Co., 11 W. 42nd St., New York 18.

Air Compressors (See Compressors, Air and Gas)

Air Conditioning Units

Carrier Corp., Carrier Bldg., Syracuse 1.

General Electric Co., Lawrence St., Bloomfield, N. J.

Pacific Mfg. Corp., 5308 Blanche Ave. S.E., Cleveland 4.

Ruemelin Mfg. Co., 3900 Palmer St., Milwaukee 12.

Westinghouse Electric Corp., Pacific Ave., Jersey City 4.

Young Radiator Co., 709 Main St., Racine, Wis.

York Corp., York, Pa.

Air Dust Guns

Acme Tool Co., 96 Warren St., New York 7.

Binks Mfg. Co., Kedzie Ave., Chicago

Condenser Service and Engineering Co., 100 River St., Hoboken, N. J.

Dutton-Lainson Co., Hastings, Neb.

Jenkins Bros., 30 White St., New York.

Kellogg Div. American Brake Shoe Co., Humboldt St., Rochester, N. Y.

Lunkenheimer Co., Beekman St., Cincinnati.

Paasche Airbrush Co., 1950 Diversey Parkway, Chicago.

Air Filters (See Filters, Air)

Air Supply Systems

Drying Systems, Inc., 1825 Foster Ave., Chicago 40.

General Engineering & Mfg. Co., 4417 Olentha Ave., St. Louis 18.

Joy Mfg. Co., Sullivan Div., Michigan City, Ind.

Milwaukee Metal Spinning Co., 4122 W. State St., Milwaukee 8.

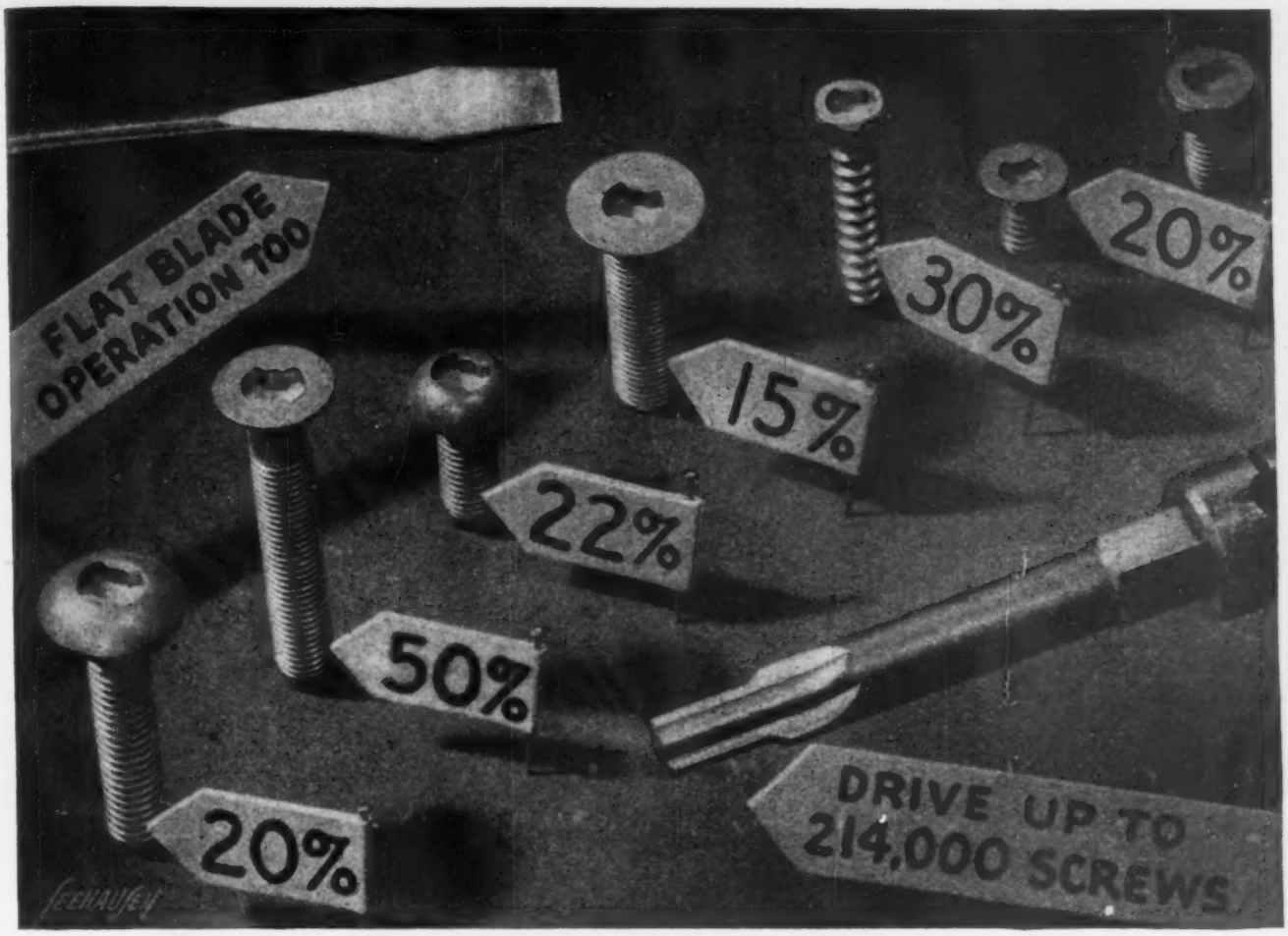
Powermatic Ventilator Co., 4014 Prospect Ave., Cleveland 3.

The Trane Co., La Crosse, Wis.

Airless Blast Cleaning

American Foundry Eqpt. Co. Inc., 412 S. Byrkit St., Mishawaka, Ind.

Dreisbach Engineering Corp., 85 Warburton Ave., Yonkers 2, N. Y.



Here's How CLUTCH HEAD *Lowers the Cost of Driving Screws*

These Production Increases Tell the Story

Double-check these exclusive features of "America's Most Modern Screw" and determine what they mean to your assembly line in terms of *lower screw application cost*.

√ ***The smooth speedy tempo of the line*** is unhindered by operator hesitation. High visibility of the roomy Clutch recess inspires confidence with an easy-to-hit target.

√ ***The time toll of burred or chewed-up heads*** is eliminated by CLUTCH HEAD'S non-canting driving action. The Center Pivot column on the Type "A" Bit makes straight driving automatic . . . even with "green" operators.

√ ***Skid damage to men and materials*** is checked out by CLUTCH HEAD'S all-square non-tapered driving contact...for definitely *higher non-stop speed*, and with maximum safety.

√ ***With no end pressure to combat "ride-out"*** (as set up by tapered driving) the CLUTCH HEAD drive-home is effortless, disposing of a fatigue factor. No end-of-the-shift lag means more screws driven.

√ ***Rugged Bit drives up to 214,000 screws*** without stop for tool change. Add to this production gain the multiple saving in tool cost . . . because the Type "A" Bit may be repeatedly reconditioned in 60 seconds.

√ ***The Lock-On ousts fumbling fingers*** by uniting screw and bit as a unit for one-handed reaching at any angle into inside spots. This feature frequently dispenses with use of a second operator.

√ ***Basic design for screwdriver operation*** is a boon to service men and users . . . simplifying emergency field adjustments to save valuable operating time.

√ ***Ask us to send you*** package assortment of screws along with sample Type "A" Bit and illustrated Brochure . . . so that you may personally check these features.

CLUTCH HEAD SCREWS

"AMERICA'S MOST MODERN SCREW"

UNITED SCREW AND BOLT CORPORATION

CLEVELAND 2 CHICAGO 8 NEW YORK 7

WHO SELLS IT?

Hydro-Blast Corp., 2550 N. Western Ave., cor. Logan Blvd., Chicago 47.

Alumina, Fused Grain

Carborundum Co., Refractories Div., Perth Amboy, N. J.

The Cleveland Tool & Supply Co., 1427 W. 6th St., Cleveland 13.

Reynolds Metals Co., Aluminum Div., Louisville 1.

Aluminum (See also Metals, Nonferrous)

Aluminum Co. of America, Gulf Bldg., Pittsburgh 19.

Apex Smelting Co., 2600 W. Taylor St., Chicago 12.

Baron Steel Co., 4075 Detroit Ave., Toledo 12.

Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit.

Caine Steel Co., 1820 No. Central Ave., Chicago 39.

Central Steel & Wire Co., 3000 W. 51st St., Chicago 32.

Commerce Pattern Foundry & Machine Co., 7450 Melville at Green, Detroit 17.

Diamond Steel Co., Inc., 3600 W. Fullerton Ave., Chicago 47.

Federated Metals Div., American Smelting Refining Co., 120 Broadway, New York 5.

Niagara Falls Smelt. & Refg. Div., Continental-United Indus. Co., Inc., 2208 Elmwood Ave., Buffalo 17.

Permanente Products Co., Kaiser Bldg., Oakland 12, Cal.

Reilly Tar & Chemical Corp., Merchants Bank Bldg., Indianapolis 4.

Revere Copper and Brass Inc., 230 Park Ave., New York 17.

Reynolds Metals Co., Aluminum Div., Louisville 1.

Southern Rail & Equipment Co., 1220 Riverside Dr., Knoxville 4, Tenn.

Aluminum Alloys (See also Metals, Nonferrous)

American Brake Shoe Co., 230 Park Ave., New York 17.

Central Steel & Wire Co., 3000 W. 51st St., Chicago 32.

Electric Refractories & Alloys Corp., Vare Bldg., 344 Delaware Ave., Buffalo 2.

Federated Metals Div., American Smelting Refining Co., 120 Broadway, New York 5.

Glazer Steel Corp., 2103 Ailor Ave., Knoxville, Tenn.

Metal Hydrides, Inc., 16 Congress St., Beverly, Mass.

Niagara Falls Smelt. & Refg. Div. Continental-United Indus. Co., Inc., 2208 Elmwood Ave., Buffalo 17.

Revere Copper and Brass Inc., 230 Park Ave., New York 17.

Reynolds Metals Co., Aluminum Div., Louisville 1.

Aluminum Bronze (See also Metals, Nonferrous)

American Non-Gran Bronze Co., Berwyn, Pa.

Ampco Metal, Inc., 1745 So. 38th St., Milwaukee.

The Glidden Co., 11001 Madison Ave., Cleveland 2.

Mueller Brass Co., 1925 Lapeer Ave., Port Huron, Mich.

Nassau Smelting & Refining Co., 170 Fulton St., New York 7.

Niagara Falls Smelt. & Refg. Div. Continental-United Indus. Co., Inc., 2208 Elmwood Ave., Buffalo 17.

WHO SELLS IT?

Revere Copper and Brass Inc., 230 Park Ave., New York 17.

Thompson & Co., 1085 Allegheny Ave., Oakmont, Pa.

Weiger Weed & Co., 11644 Cloverdale Ave., Detroit 4.

Aluminum Cleaners (See also Cleaners, Metal)

Allied Industrial Products Co., 620 N. Michigan Ave., Chicago 11.

American Chemical Paint Co., Ambler, Pa.

Enthone, Inc., 442 Elm St., New Haven 11, Conn.

Hanson-Van Winkle Munning Co., Matawan, N. J.

Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7.

The Puritan Mfg. Co., Waterbury, Conn.

James H. Rhodes & Company, 167 W. Hubbard St., Chicago 10.

Turco Products, Inc., P. O. Box 2649 Terminal Annex, Los Angeles 54.

Wyandotte Chemicals Corp., Wyandotte, Mich.

Aluminum Coloring Process

Hanson-Van Winkle Munning Co., Matawan, N. J.

Aluminum Copper Clad (See also Metals, Nonferrous)

Reynolds Metal Co., Aluminum Div., Louisville 1.

Aluminum Oxide, Powdered

Aluminum Ore Co., Gulf Bldg., Pittsburgh.

Baker, J. T., Chemical Co., Phillipsburg, N. J.

Harshaw Chemical Co., 97th St., Cleveland.

Kohnstamm, H., Co., 85 Park Place, New York.

Monsanto Chemical Co., S. 2nd St., St. Louis.

Pennsylvania Salt Mfg. Co., 1340 Chestnut St., Philadelphia 7.

Rhodes, James H. & Co., 29th St., Long Island City, N. Y.

Whittaker, Clark & Daniels, Inc., 260 W. Broadway, New York 13.

Aluminum Powders

du Pont de Nemours & Co., E. I., Inc., Wilmington 98.

The Glidden Co., 11001 Madison Ave., Cleveland 2.

Magna Mfg. Co., Inc., 444 Madison Ave., New York 22.

McAleer Mfg. Co., Fourth & Water Sts., Rochester, Mich.

Reynolds Metals Co., Aluminum Div., Louisville 1.

Aluminum Sulfate

American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York.

Baker, J. T., Chemical Co., Phillipsburg, N. J.

Davison Chemical Corp., Hopkins St., Baltimore.

du Pont de Nemours & Co., E. I., Inc., Wilmington 98, Del.

Harshaw Chemical Co., 97th St., Cleveland.

Hercules Powder Co., Market St., Wilmington, Del.

Merck & Co., Inc., Rahway, N. J.

Monsanto Chemical Co., St. Louis 4.

Pennsylvania Salt Mfg. Co., 1340 Chestnut St., Philadelphia 7.

WHO SELLS IT?

Aluminum Welding Rods (See Welding Rods Aluminum)

Ammeters

Alemite Div., Stewart-Warner Corp., 1828 Diversey Parkway, Chicago 14.

Botwinik Bros. of Mass., Inc., (Used), 5 Sherman St., Worcester 1, Mass.

Columbia Electric Mfg. Co., 4519 Hamilton Ave., Cleveland 14.

The Electric Auto-Lite Co., Toledo 1.

Enthone, Inc., 442 Elm St., New Haven 1, Conn.

Hanson-Van Winkle Munning Co., Matawan, N. J.

The Martindale Electric Co., Cleveland 7.

Sommers Bros. Mfg. Co., 3439-41-43 N. Broadway, St. Louis 7.

Herman H. Sticht Co., Inc., 27 Park Pl., New York 7.

Westinghouse Electric Corp., 1st National Bank Bldg., Pittsburgh 22.

Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.

Ammonia, Anhydrous

du Pont de Nemours & Co., E. I., Inc., Wilmington 98.

The Mathieson Alkali Works, Inc., 60 E. 42nd St., New York 17.

Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7.

Ammonia Plants and Equipment

Koppers Company, Inc., Koppers Bldg., Pittsburgh 19.

Ammonium Chloride (Sal-Ammoniac)

Beam-Knodel Co., 195 Lafayette St., New York 12.

du Pont de Nemours & Co., E. I., Inc., Wilmington 98.

Hanson-Van Winkle Munning Co., Matawan, N. J.

Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7.

Solvay Sales Corp., 40 Rector St., New York 6

Somers Bros. Mfg. Co., 3439-41-43 No. Broadway, St. Louis 7.

Angle Adapters, Heads and Attachments, Tool

Invincible Tool Co., 611-613 Empire Bldg., Pittsburgh 22.

Annealing Boxes (See also Steel Mill Equipment)

Alloy Casting Co., Victor Ave., Champaign, Ill.

Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh 1.

Continental Foundry & Mach. Co., Grant Bldg., Pittsburgh 19.

Driver-Harris Co., P. O. Drawer No. 31, Harrison, N. J.

The Gas Machinery Co., 16100 Waterloo Rd., Cleveland 10.

Loftus Engineering Corp., 610 Smithfield St., Pittsburgh 22.

Mesta Machine Co., P. O. Box 1466, Pittsburgh 30.

Michiana Products Corp., Michigan City, Ind.

Ohio Steel Foundry Co., P. O. Box 900, Springfield, Ohio.

Pittsburgh Annealing Box Co., 801 Beaver Ave., Pittsburgh 12.

Ross-Meehan Foundries, P. O. Box 1258, Chattanooga, Tenn.

Stanwood Corp., 4808 Cortland St., Chicago 39.

WHO SELLS IT?

Sterling Alloys, Inc., Woburn, Mass.

Walz & Krenzer Inc., 250 Mount Hope Ave., Rochester 7.

Annealing Carbon

Char. Products Co., Merchants Bank Bldg., Indianapolis 4.

Annealing Covers (See also Steel Mill Equipment)

Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh.

National Annealing Box Co., Washington, Pa.

Annealing Crates (See also Steel Mill Equipment)

The Gas Machinery Co., 16100 Waterloo Rd., Cleveland 10.

National Annealing Box Co., Washington, Pa.

Ohio Steel Foundry Co., P. O. Box 900, Springfield, Ohio.

Ross-Meehan Foundries, P. O. Box 1258, Chattanooga 1, Tenn.

Stanwood Corp., 4808 Cortland St., Chicago 39.

Sterling Alloys, Inc., Woburn, Mass.

Walz & Krenzer Inc., 250 Mt. Hope Ave., Rochester 7.

The Youngstown Welding & Engineering Co., 3800 W. Oakwood Ave., Youngstown 9.

Annealing Furnaces (See Furnaces, Annealing)

Annealing Pots (See also Steel Mill Equipment)

American Car & Foundry Co., 36 Church St., New York.

Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh.

Continental Foundry & Machine Co., E. Chicago, Ind.

Driver Harris Co., Harrison, N. J.

General Alloys Co., W. First St., Boston, Mass.

Pittsburgh Steel Foundry Corp., Glassport, Pa.

Stewart Furnace Div., 1130 Central Ave., Chicago.

Swedish Crucible Steel Co., Butler St., Detroit.

Anode Savers

Hanson-Van Winkle Munning Co., Matawan, N. J.

Nankervis Co., Geo. L., 5442 Second Blvd., Detroit 2.

Stevens, Inc., Frederic B., 510 Third St., Detroit 26.

Anodes, Cadmium

Beam-Knodel Co., 195 Lafayette St., New York 12.

Du Pont De Nemours & Co., E. I., Inc., Wilmington 98.

Hanson-Van Winkle Munning Co., Matawan, N. J.

Nankervis Co., Geo. L., 5442 Second Blvd., Detroit 2.

Sommers Bros. Manufacturing Co., 3439-41-43 No. Broadway, St. Louis 7.

Anodes, Carbon

Beam-Knodel Co., 195 Lafayette St., New York 12.

Hanson-Van Winkle Munning Co., Matawan, N. J.

International Graphite & Electrode Corp., St. Marys, Pa.

Nankervis Co., Geo. L., 5442 Second Blvd., Detroit 2.

National Carbon Co., Inc., 30 E. 42nd St., New York 17.

WHO SELLS IT?

Sommers Bros. Manufacturing Co., 3439-41-43 No. Broadway, St. Louis 7.

Stackpole Carbon Co., St Marys, Pa.

Stevens, Inc., Frederic B., 510 Third St., Detroit 26.

Anodes, Copper

Allied Industrial Products Co., 620 N. Michigan Ave., Chicago 11.

American Brass Company, The, Waterbury 88, Conn.

Beam-Knodel Co., 195 Lafayette St., New York 12.

Central Steel & Wire Co., 3000 W. 51st St., Chicago 32.

Du Pont De Nemours & Co., E. I., Inc., Wilmington 98.

Enthone, Inc., 442 Elm St., New Haven 11, Conn.

Federal Metals Div., American Smelting Refining Co., 120 Broadway, New York 5.

Hanson-Van Winkle Munning Co., Matawan, N. J.

Puritan Manufacturing Co., Waterbury, Conn.

Revere Copper and Brass Inc., 230 Park Ave., New York 17.

Scovill Manufacturing Company, 99 Mill St., Waterbury, Conn.

Sommers Bros. Manufacturing Co., 3439-41-43 No. Broadway, St. Louis 7.

Stevens Inc., Frederic B., 510 Third St., Detroit 26.

Anodes, Gold

Baker & Co., Inc., 113 Astor St., Newark 5, N. J.

Handy & Harman, 82 Fulton St., New York 7.

Stevens, Inc., Frederic B., 510 Third St., Detroit 26.

Anodes, Indium

Indium Corp. of America, The, 60 E. 42nd St., New York 17.

Anodes, Lead

Beam-Knodel Co., 195 Lafayette St., New York 12.

Du Pont De Nemours & Co., E. I., Inc., Wilmington 98.

Enthone, Inc., 442 Elm St., New Haven 11, Conn.

Hanson-Van Winkle Munning Co., Matawan, N. J.

Heil Process Equipment Corp., 12901 Elmwood Ave., Cleveland 11.

National Lead Company, 111 Broadway, New York 6.

Puritan Manufacturing Co., Waterbury, Conn.

Sommers Bros. Manufacturing Co., 3439-41-43 No. Broadway, St. Louis 7.

Stevens Inc., Frederic B., 510 Third St., Detroit 26.

U. S. Stoneware Co., P. O. Box 350, Akron, Ohio.

Anodes, Nickel

Allied Industrial Products Co., 620 N. Michigan Ave., Chicago 11.

Beam-Knodel Co., 195 Lafayette St., New York 12.

Du Pont De Nemours & Co., E. I., Inc., Wilmington 98.

Enthone, Inc., 442 Elm St., New Haven 11.

Hanson-Van Winkle Munning Co., Matawan, N. J.

Nankervis Co., Geo. L., 5442 Second Blvd., Detroit 2.

Puritan Manufacturing Co., The, Waterbury, Conn.

WHO SELLS IT?

Sommers Bros. Manufacturing Co., 3439-41-43 No. Broadway, St. Louis 7.

Stevens Inc., Frederic B., 510 Third St., Detroit 26.

Superior Tube Company, Norristown, Pa.

Anodes, Silver

Baker & Co., Inc., 113 Astor St., Newark 5, N. J.

Beam-Knodel Co., 195 Lafayette St., New York 12.

Handy & Harman, 82 Fulton St., New York 7.

Hanson-Van Winkle Munning Co., Matawan, N. J.

Sherman & Co., 196 Canal St., New York 13.

Sommers Bros. Manufacturing Co., 3439-41-43 No. Broadway, St. Louis 7.

Stevens Inc., Frederic B., 510 Third St., Detroit 26.

Anodes Stainless

Superior Tube Company, Norristown, Pa.

Anodes, Tin

Beam-Knodel Co., 195 Lafayette St., New York 12.

Du Pont De Nemours & Co., E. I., Inc., Wilmington 98.

Hanson-Van Winkle Munning Co., Matawan, N. J.

Sommers Bros. Manufacturing Co., 3439-41-43 No. Broadway, St. Louis 7.

Stevens Inc., Frederic B., 510 Third St., Detroit 26.

Anodes, Zinc

Beam-Knodel Co., 195 Lafayette St., New York 12.

Du Pont De Nemours & Co., E. I., Inc., Wilmington 98.

Enthone, Inc., 442 Elm St., New Haven 11.

Federal Metals Division, American Smelting Refining Co., 120 Broadway, New York 5.

Hanson-Van Winkle Munning Co., Matawan, N. J.

New Jersey Zinc Co., 160 Front St., New York 7.

Sommers Bros. Manufacturing Co., 3439-41-43 No. Broadway, St. Louis 7.

Stevens Inc., Frederic B., 510 Third St., Detroit 26.

Puritan Manufacturing Co., Waterbury, Conn.

Anodizing Equipment

Beam-Knodel Co., 195 Lafayette St., New York 12.

Crown Rheostat & Supply Co., 3465 N. Kimball Ave., Chicago 18.

The Electric Products Co., 1725 Clarkstone Rd., Cleveland 12.

Enthone, Inc., 442 Elm St., New Haven 11.

Hanson-Van Winkle Munning Co., Matawan, N. J.

Heil Process Equipment Corp., 12901 Elmwood Ave., Cleveland 11.

Nankervis Co., Geo. L., 5442 Second Blvd., Detroit 2.

Puritan Manufacturing Co., Waterbury, Conn.

Sommers Bros. Manufacturing Co., 3439-41-43 No. Broadway, St. Louis 7.

Stevens Inc., Frederic B., 510 Third St., Detroit 26.

U. S. Galvanizing & Plating Equipment Corp., 27-41 Heyward St., Brooklyn 11, N. Y.

Anodizing Process

Hanson-Van Winkle Munning Co., Matawan, N. J.

WHO SELLS IT?

Sommers Bros. Manufacturing Co., 3439-41-43 No. Broadway, St. Louis 7.

Stevens Inc., Frederic B., 510 Third St., Detroit 26.

U. S. Galvanizing & Plating Equipment Corp., 27-41 Heyward St., Brooklyn 11, N. Y.

Anodizing Racks

Enthone, Inc., 442 Elm St., New Haven 11.

Heil Process Equipment Corp., 12901 Elmwood Ave., Cleveland 11.

Nankervis Co., Geo. L., 5442 Second Blvd. Detroit 2.

Stevens Inc., Frederic B., 510 Third St., Detroit 26.

Anticorrosive Finishes (See Finishes Corrosion Resistant)

Antimony

Belmont Smelting & Refining Works, Belmont Ave., Brooklyn, N. Y.

Bunker Hill & Sullivan Mining & Concentrating Co., Crocker Bldg., San Francisco

Federated Metals Div., American Smelting & Refining Co., 19 Nassau St., New York.

National Lead Co., 111 Broadway, New York.

St. Joseph Lead Co., 250 Park Ave., New York.

United American Metals Corp., 208 Diamond Ave., Brooklyn.

Aprons

Advance Glove Mfg. Co., 215 W. Ontario St., Chicago 10.

Enthone, Inc., 442 Elm St., New Haven 11.

Industrial Products Co., 2746 N. 4th St., Philadelphia 33.

Jessar, Fred, 1230 Vine St., Philadelphia 7.

Arbors, Adapting (See also Tools, Cutting)

Jacobs Mfg. Co., Hartford 2.

Arbors, Shell Reamer (See also Tools, Cutting)

Chicago Latrobe Twist Drill Works, 411 W. Ontario St., Chicago 10.

Whitman & Barnes, Div. of United Drill & Tool Corp., Detroit 16.

Argon

Air Reduction Sales Co., 60 E. 42nd St., New York.

American Oxygen Service Corp., Essex St., Harrison, N. J.

Linde Air Products Co., 30 E. 42nd St., New York 17.

Ohio Chemical & Mfg. Co., Hanna Bldg., Cleveland.

Arresters, Dust (See also Dust Control Systems)

American Foundry Equipment Co., Inc., 412 S. Byrkit St., Mishawaka, Ind.

C. O. Bartlett & Snow Co., 6200 Harvard Ave., Cleveland 5.

F. S. Knowles, 77 W. Washington St., Suite 1702, Chicago 2.

Metallizing Engineering Co., 38-14 30th St., Long Island City 1, N. Y.

Parsons Engineering Corp., 2549 E. 79th St., Cleveland 4.

St. Louis Blow Pipe & Heater Co., Inc., 1948-60 N. 9th St., St. Louis 6.

Torit Mfg. Co., Walnut & Exchange Sts., St. Paul 2.

Asbestos

Alsop Engineering Corp., Milldale, Conn.

WHO SELLS IT?

Gatke Corp., 228 N. LaSalle St., Chicago 1.

Industrial Products Co., 2746 N. 4th St., Philadelphia 33.

Johns-Manville Sales Corp., 22 E. 40th St., New York 16.

Tremco Mfg. Co., 8710 Kinsman Rd., Cleveland 4.

Asphalt and Asphalt Products

Glidden Co., 11001 Madison Ave., Cleveland 2.

National Refining Co., Hanna Bldg., Cleveland 15.

Pure Oil Co., 35 E. Wacker Dr., Chicago 1.

Socony-Vacuum Oil Co., Inc., 26 Broadway, New York 4.

Tremco Mfg. Co., 8710 Kinsman Rd., Cleveland 4.

U. S. Stoneware Co., P. O. Box 350, Akron, Ohio.

Asphalt Floors, Acid Proof

Tremco Mfg. Co., 8710 Kinsman Road, Cleveland 4.

U. S. Stoneware Co., P. O. Box 350, Akron, Ohio.

Atmosphere Equipment and Controls

Automatic Temperature Control Co., Inc., 34 E. Logan St., Philadelphia 44.

Gas Machinery Co., 16100 Waterloo Rd., Cleveland 10.

W. S. Rockwell Co., 200 Eliot St., Fairfield, Conn.

Sunbeam Stewart Industrial Furnace Div. Sunbeam Corp., 4433 W. Ogden Ave., Chicago 23.

Surface Combustion Corp., 2375 Dorr St., Toledo 1.

Westinghouse Electric Corp., East Pittsburgh, Pa.

Attachments, Jigs, Etc.

Armstrong Bros. Tool Co., 330 N. Francisco Ave., Chicago 12.

Brown & Sharpe Mfg. Co., 236 Promenade St., Providence 1.

Bullard Co., Ray St., Bridgeport, Conn.

Cushman Chuck Co., 800 Windsor St., Hartford 1, Conn.

Erickson Tools Div., Erickson Steel Co., 2300 Hamilton Ave., Cleveland.

General Die & Stamping Co., 262 Mott St., New York 13.

Jacobs Mfg. Co., Jacobs Rd., Hartford 1, Conn.

Jones & Lamson Machine Co., Springfield, Vt.

Landis Machine Co., Waynesboro, Pa.

Leach, H., Machinery Co., 387 Charles St., Providence 4.

La Bahn Machine & Mfg. Co., 536 Lincoln Highway, Menlo Park, N. J.

Merz Engineering Co., Harding St., Indianapolis 7.

Nicholson, W. H., & Co., 140 Oregon St., Wilkes-Barre, Pa.

R & L Tools, 1825 Bristol St., Philadelphia 40.

Standard Shop Equipment Co., 8300 Tinicum Ave., Philadelphia.

Taft-Peirce Mfg. Co., Woonsocket, R. I.

Augers

Chicago-Latrobe Twist Drill Works, W. Ontario St., Chicago.

Greenlee Tool Co., Columbia Ave., Rockford, Ill.

Automatic Spray Machines (See Spray Machines Automatic)

WHO SELLS IT?

B

Babbitt Metals

American Brake Shoe Co., 230 Park Ave., New Yok 17.

Federated Metals Div., American Smelting & Refining Co., 120 Broadway, New York 5.

Nassau Smelting & Refining Co., 170 Fulton St., New York 7.

National Lead Co., 111 Broadway, New York 6.

Westinghouse Electric Corp., East Pittsburgh, Pa.

Backwall Coolers (See Coolers, Wall)

Baffles

Babcock & Wilcox Co., 85 Liberty St., New York City.

Black, Sivalls & Bryson, Inc., 2135 Westwood Blvd. Oklahoma City, Okla.

Harbison-Walker Refractories Co., Farmers Bank Bldg., Pittsburgh 22.

Mexico Refractories Co., Mexico, Mo.

Pettinos, George F., Inc., 1195 Locust St., Philadelphia.

Ramtie Co., 2550 W. 18th St., Chicago.

Baking Ovens (See Ovens, Baking)

Balancing Machines

Alemite Div., Stewart-Warner Corp., 1828 Diversey Parkway, Chicago 14.

Commerce Pattern Foundry & Machine Company, 7450 Melville at Green, Detroit 17.

Gisholt Machine Co., 1300 Washington Ave., Madison 3, Wis.

Ideal Industries Inc., Sycamore, Ill.

Manderscheid Co., 810 Fulton St., Chicago 7.

Simmons Machine Tool Corp., Albany 1, N. Y.

Sommers Bros. Mfg. Co., 3439-41-43 N. Broadway, St. Louis 7.

Stewart-Warner Corp., 1826 Diversey, Chicago 1.

Taft-Peirce Mfg. Co., Woonsocket, R. I.

Tinius Olsen Testing Machine Co., 500 N. 12th St., Philadelphia 23.

Westinghouse Electric Corp., East Pittsburgh, Pa.

Baling Machines

Economy Baler Co., 325 Langford St., Ann Arbor, Mich.

Galland-Henning Mfg. Co., So. 31st St., Milwaukee.

Ritterbush & Co., Inc., 50 Church St., New York 7.

Baling and Briquetting Presses (See Briquetting and Baling Presses)

Ball Mills

International Engineering, Inc., Dayton, Ohio.

Abbott Ball Co., New Britain Ave., Hartford, Conn.

Hartford Steel Ball Co., Park Ave., Hartford, Conn.

Balls (See Burnishing Balls)

Balls, Cones, Pine and Slugs (See Burnishing Slugs)

Balls, Steel, Bronze, and Special Metals

Abbott Ball Co., New Britain Ave., Hartford, Conn.

Hartford Steel Ball Co., 495 Park Ave Hartford 6, Conn.

Hoover Ball & Bearing Co., Lennox St., Ann Arbor, Mich.

WHO SELLS IT?

Nice Ball Bearing Co., 2980 Hunting Park Ave., Philadelphia.

Plume & Atwood Mfg. Co., Bank St., Waterbury, Conn.

Strom Steel Ball Co., 1840 S. 54th St., Cicero 50, Ill.

SKF Industries, Inc., Front St. & Erie Ave., Philadelphia 34.

Universal Ball Co., Willow Grove, Montgomery Co., Pa.

Band Saws, Metal Cutting (See Saws, Band, Metal Cutting)

Band Saw Blades, Metal Cutting (See Blades, Band Saw, Metal Cutting)

Bar Drawing and Straightening Machines

Aetna-Standard Engineering Co., 275 W. Federal St., Youngstown 1, Ohio.

Bertsch & Co., Center St., Cambridge City, Ind.

Botwinik Bros. of Mass. Inc. (New and used), 5 Sherman St., Worcester 1, Mass.

Cleveland Crane & Engineering Co., E. 283rd St. Wickliffe, Ohio.

Donahue Steel Products Co. Inc., 1919 W. 74th St., Chicago 36.

General Mfg. Co., 6430 Farnsworth Ave., Detroit 11.

Interstate Machinery Co., 1435 W. Pershing Rd., Chicago 9.

Lake Erie Engineering Corp., Buffalo 17.

Mackintosh Hemphill Co., 901 Binghamton St., Pittsburgh 3.

Simmons Machine Tool Corp., Albany 1, N. Y.

West Penn Machinery Co., 1210 House Bldg., Pittsburgh 22.

Bars, Steel

Ajax Steel & Forge Co., 205 Adair St., Detroit 7.

American Steel & Wire Co., 450 Rockefeller Bldg., Cleveland.

Baron Steel Co., 4075 Detroit Ave., Toledo 12.

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13.

Bethlehem Steel Co., Bethlehem, Pa.

Brown-Wales Co., 493 C St., Boston 10.

Buffalo Steel Co., Tonawanda, N. Y.

Bushwick Iron & Steel Co. Inc., 110-142 Green St., Brooklyn 22.

Carnegie-Illinois Steel Corp., Carnegie Bldg., 434 5th Ave., Pittsburgh 30.

The Carpenter Steel Co., 321 W. Bern St., Reading, Pa.

Central Steel & Wire Co., 3000 W. 51st St., Chicago 32.

Colorado Fuel & Iron Corp., Continental Bldg., Denver, Colo.

Columbia Steel Co., Russ Bldg., San Francisco 6.

Columbia Steel & Shafting Co., P. O. Box 1557, Pittsburgh 30.

Cumberland Steel Co., P. O. Box 28, Cumberland, Md.

Henry Disston & Sons, Inc., 4619 Tacony, Tacony, Philadelphia 35.

Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13.

Glazer Steel Corp., 2203 Allor Ave., Knoxville, Tenn.

Heppenstall Co., Hatfield St., Pittsburgh 1.

Holliday, W. J., & Co., Polk Blvd. & Wabash Ave., Hammond, Ind.

Indianapolis Machy. & Sup. Co., 1959-1969 S. Meridian St., Indianapolis 6, Ind.

Inland Steel Co., 38 S. Dearborn St., Chicago 3.

Jessop Steel Co., Washington, Pa.

WHO SELLS IT?

Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Third Ave. & Ross St., Pittsburgh 30.

Earle M. Jorgenson Co., Box 2358, Terminal Annex, Los Angeles 54.

Laclede Steel Co., Arcade Bldg., 8th & Olive Sts., St. Louis 1.

Lockhart Iron & Steel Co., McKees Rocks, Pa.

Midwest Steel Corp., Box 271, Charleston 21, W. Va.

Missouri Rolling Mill Corp., 6800 Manchester Ave., St. Louis 10.

Monarch Steel Co., 543 W. McCarty St., Indianapolis 7.

National Steel Corp., Grant Bldg., Pittsburgh 19.

Peterson Steels, Inc., 420 Lexington Ave., New York 17.

Sheffield Steel Corp., Sheffield Sta., Kansas City 3, Mo.

Steel Sales Corp., 3352 S. Pulaski Rd., Chicago 23.

Sweet's Steel Co., 3000 Sweet St., Williamsport 62, Pa.

Timken Roller Bearing Co., Canton 6, Ohio.

United States Steel Supply Co., 1319 Wabansia Ave., Chicago 90.

Wetherell Bros. Co., 251 Albany St., Cambridge A, Mass.

Bars, Steel, Rail

Franklin Steel Works, P. O. Box 671, Franklin, Pa.

Inland Steel Co., 38 S. Dearborn St., Chicago 3.

Ryerson, Jos. T., & Son, Inc., Box 8000 Chicago.

Sweet's Steel Co., Williamsport 62, Pa.

United States Steel Supply Co., Chicago.

Bars, Tool Steel

Colonial Steel Division, Vanadium-Alloys Steel Co., Latrobe, Pa.

Allegheny Ludlum Steel Corp., Ferndale, Mich.

Central Steel & Wire Co., W. 51st St., Chicago.

Columbia Tool Steel Co., Chicago Heights, Ill.

Crucible Steel Co. of America, 1100 Chrysler Bldg., New York City.

Ryerson, Jos. T., & Sons, Inc., Box 8000, Chicago.

SKF Steels, Inc., 400 W. Baltimore Ave., Detroit.

Bars, Wrought Iron

American Car & Foundry Co., 34 Church St., New York City.

Ames, W., & Co., 422 Communipaw Ave., Jersey City, N. J.

Ulster Iron Works, Dover, N. J.

Baskets, Dipping

Alloy Casting Co., Victor Ave., Champaign, Ill.

Ampco Metal, Inc., 1745 So. 38th St., Milwaukee, Wis.

Beam-Knodel Co., 195 Lafayette St., New York 12.

Central Steel & Wire Co., 3000 W. 51st St., Chicago 32.

Chicago Steel Foundry Co., Kedzie Ave., & 37th St., Chicago 32.

Cleveland Wire Cloth & Mfg. Co., 3573 E. 78th St., Cleveland 5.

Enthone, Inc., 442 Elm St., New Haven 11, Conn.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

WHO SELLS IT?

Heil Process Equipment Corp., 12901 Elmwood Ave., Cleveland 11.

Hendrick Mfg. Company, 37 Dundaff St., Carbondale, Pa.

International Conveyor & Washer Corp., 652 E. Fort St., Detroit 26.

Puritan Manufacturing Co., Waterbury, Conn.

Sommers Bros. Manufacturing Co., 3439-41-43 N. Broadway, St. Louis 7.

Stanwood Corp., 4808 Cortland St., Chicago 39.

Sterling Alloys, Inc., Woburn, Mass.

Stevens Inc., Frederic B., 510 Third St., Detroit 26.

Tyler Co., W. S., 3615 Superior Ave., Cleveland 14.

Union Steel Products Co., 442 Pine St., Albion, Mich.

U. S. Stoneware Co., P. O. Box 350, Akron, Ohio.

Walz & Krenzer Inc., 250 Mt. Hope Ave., Rochester 7, N. Y.

Youngstown Welding & Engineering Co., 3800 W. Oakwood Ave., Youngstown 9, Ohio.

Bar Twisting Machinery

Blaw-Knox Company, Farmers Bank Bldg., Pittsburgh.

Cleveland Crane & Engineering Co., Wickliffe, Ohio.

Mesta Machine Co., P. O. Box 1466, Pittsburgh.

United Engineering & Foundry Co., First National Bank Bldg., Pittsburgh.

Barium

Baker, J. T., Chemical Co., Phillipsburgh, N. J.

Barium Products, Ltd., 405 Lexington Ave., New York City.

Belmont Smelting & Refining Works, 310 Belmont Ave., Brooklyn, N. Y.

Westvaco Chlorine Products Co., Chrysler Bldg., New York City.

Barrels, Air-Blast Cleaning

Dreisbach Engineering Corp., 85 Warburton Ave., Yonkers 2, N. Y.

Milwaukee Metal Spinning Co., 4122 W. State St., Milwaukee 8, Wis.

Parsons Engineering Corp., 2549 E. 79th St., Cleveland 4.

Barrels, Electroplating

Beam-Knodel Co., 195 Lafayette St., New York 12.

Crown Rheostat & Supply Co., 3465 N. Kimball Ave., Chicago 18.

Daniels Plating Barrel Co., 129 Oliver St., Newark, N. J.

Enthone, Inc., 442 Elm St., New Haven 11, Conn.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Nankervis Co., Geo. L., 5442 Second Blvd., Detroit 2.

Puritan Manufacturing Co., Waterbury, Conn.

Sommers Bros. Manufacturing Co., 3439-41-43 N. Broadway, St. Louis 7.

Stevens, Frederic B., Inc., 510 Third St., Detroit 26.

WHO SELLS IT?

U. S. Galvanizing & Plating Equipment Corp., 27-41 Heyward St., Brooklyn 11, N. Y.

U. S. Stoneware Co., P. O. Box 350, Akron, Ohio.

Barrels, Polishing

Abbott Ball Co., New Britain Ave., Hartford 10, Conn.

Beam-Knodel Co., 195 Lafayette St., New York 12.

Crown Rheostat & Supply Co., 3465 N. Kimball Ave., Chicago 18.

Enthone, Inc., 442 Elm St., New Haven 11, Conn.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Hartford Steel Ball Co., New Park Ave. & Jefferson St., Hartford 6, Conn.

Ransohoff, N., Inc., Elmwood Place, Cincinnati 16.

Ransome Machinery Co., Dunellen, N. J.

Sommers Bros. Manufacturing Co., 3439-41-43 No. Broadway, St. Louis 7.

U. S. Stoneware Co., P. O. Box 350, Akron, Ohio.

Barrels, Tumbling

Abbott Ball Co., New Britain Ave., Hartford 10, Conn.

Beam-Knodel Co., 195 Lafayette St., New York 12.

Crown Rheostat & Supply Co., 3465 N. Kimball Ave., Chicago 18.

Donahue Steel Products Co. Inc., 1919 W. 74th St., Chicago 36.

Enthone, Inc., 442 Elm St., New Haven 11, Conn.

Hartford Steel Ball Co., New Park Ave. & Jefferson St., Hartford 6, Conn.

Parsons Engineering Corp., 2549 E. 79th St., Cleveland 4.

Puritan Manufacturing Co., Waterbury, Conn.

Ransohoff, N., Inc., Elmwood Place, Cincinnati 16.

Ransome Machinery Co., Dunellen, N. J.

Royersford Foundry & Machine Co. Inc., Main St., Royersford, Pa.

Sommers Bros. Manufacturing Co., 3439-41-43 No. Broadway, St. Louis 7.

U. S. Stoneware Co., P. O. Box 350, Akron, Ohio.

United Welding Co., Middletown, Ohio.

Bars, Alloy Steel

Ajax Steel & Forge Co., 205 Adair St., Detroit 7.

Allegheny Ludlum Steel Corp., Forging & Casting Div., Ferndale 20, Mich.

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13.

Baron Steel Co., 4075 Detroit Ave., Toledo 12.

Beals, McCarthy & Rogers, Inc., 50 Terrace, Buffalo 5, N. Y.

Bethlehem Steel Co., Bethlehem, Pa.

Brown-Wales Co., 493 C. St., Boston 10.

Carnegie-Illinois Steel Corp., Carnegie Bldg., 434 5th Ave., Pittsburgh 30.

Carpenter Steel Co., 321 W. Bern St. Reading, Pa.

Central Steel & Wire Co., 3000 W. 51st St., Chicago 32.

Columbia Steel Co., Russ Bldg., San Francisco 6.

Columbia Steel & Shafting Co., P. O. Box 1557, Pittsburgh 30.

Disston & Sons, Henry, Inc., 4619 Tacony, Tacony, Philadelphia 35.

Duriron Co., Inc., Dayton 1, Ohio.

WHO SELLS IT?

Glazer Steel Corp., 2103 Ailor Ave., Knoxville, Tenn.

Heppenstall Co., Hatfield St., Pittsburgh 1.

Holliday & Co., W. J., Polk Blvd. & Wabash Ave., Hammond, Ind.

Indianapolis Machy. & Sup. Co. (Distributors), 1959-69 S. Meridian St., Indianapolis 6.

Inland Steel Co., 38 S. Dearborn St., Chicago 3.

Jessop Steel Co., Washington, Pa.

Jorgensen Co., Earle M., Box 2358, Terminal Annex, Los Angeles 54.

Monarch Steel Co., 543 W. McCarty St., Indianapolis 7, Ind.

Peterson Steels, Inc., 420 Lexington Ave., New York 17.

Sheffield Steel Corp., Sheffield Sta., Kansas City 3, Mo.

Southern Rail & Equipment Co., 1220 Riverside Dr., Knoxville 4, Tenn.

Steel Sales Corp., 3352 S. Pulaski Rd., Chicago 23.

Swedish American Steel Corp., 433 Kent Ave., Brooklyn 11, N. Y.

United States Steel Supply Co., 1319 Wabansia Ave., Chicago 90.

Wetherell Bros. Co., 251 Albany St., Cambridge A, Mass.

Bars, Aluminum

Aluminum Co. of America, Gulf Bldg., Pittsburgh 19.

Baron Steel Co., 4075 Detroit Ave., Toledo 12, Ohio.

Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit.

Bristol Brass Corp., Broad St., Bristol, Conn.

Permanente Products Co., Kaiser Bldg., Oakland 12, Cal.

Reynolds Metals Co., Aluminum Div., Louisville 1, Ky.

Bars, Brass, Bronze or Copper

American Brass Company, The, Waterbury 88, Conn.

Ampco Metal, Inc., 1745 So. 38th St., Milwaukee, Wis.

Baron Steel Co., 4075 Detroit Ave., Toledo 12.

Beals, McCarthy & Rogers, Inc., 50 Terrace, Buffalo 5, N. Y.

Beam-Knodel Co., 195 Lafayette St., New York 12.

Central Steel & Wire Co., 3000 W. 51st St., Chicago 32.

Commerce Pattern Foundry & Machine Company, 7450 Melville at Green, Detroit 17.

Glazer Steel Corp., 2103 Ailor Ave., Knoxville, Tenn.

Johnson Bronze Co., 505 S. Mill St., New Castle, Pa.

Lumen Bearings Co., 197 Lathrop St., Buffalo 12, N. Y.

Mueller Brass Co., 1925 Lapeer Ave., Port Huron, Mich.

Revere Copper and Brass Inc., 230 Park Ave., New York 17.

Riverside Metal Co., Keystone Bldg., Riverside, N. J.

Scovill Manufacturing Company, 99 Mill St., Waterbury, Conn.

Southern Rail & Equipment Co., 1220 Riverside Dr., Knoxville 4, Tenn.

Steel Sales Corp., 3352 S. Pulaski Rd., Chicago 23.

Titan Metal Mfg. Co., Bellefonte, Center Co., Pa.

Western Brass Mills, Div. of Olin Industries, Inc., East Alton, Ill.

WHO SELLS IT?

Bars, Cold Drawn Steel

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13.

Baron Steel Co., 4075 Detroit Ave., Toledo 12.

Beals, McCarthy & Rogers, Inc., 50 Terrace, Buffalo 5, N. Y.

Bethlehem Steel Co., Bethlehem, Pa.

Brown-Wales Co., 493 C. St., Boston 10.

Central Steel & Wire Co., 3000 W. 51st St., Chicago 32.

Colonial Steel Division, Vanadium-Alloys Steel Co., Latrobe, Pa.

Columbia Steel Co., Russ Bldg., San Francisco 6.

Columbia Steel & Shafting Co., P. O. Box 1557, Pittsburgh 30.

Cumberland Steel Co., P. O. Box 28, Cumberland, Md.

Frasse & Co., Inc., Peter A., 17 Grand St. at 6th Ave., New York 13.

Glazer Steel Corp., 2103 Ailor Ave., Knoxville, Tenn.

Holliday & Co., W. J., Polk Blvd. & Wabash Ave., Hammond, Ind.

Indianapolis Machy. & Sup. Co. (Distributors), 1959-69 S. Meridian St., Indianapolis 6.

Jessop Steel Co., Washington, Pa.

Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Third Ave. & Ross St., Pittsburgh 30.

Jorgenson Co., Earle M., Box 2358, Terminal Annex, Los Angeles 54.

Monarch Steel Co., 543 W. McCarty St., Indianapolis 7.

Peterson Steels, Inc., 420 Lexington Ave., New York 17.

Pittsburgh Gear & Machine Co., Smallman & 27th Sts., Pittsburgh.

Steel Sales Corp., 3352 S. Pulaski Rd., Chicago 23.

Timken Roller Bearings Co., Canton 6, Ohio.

United States Steel Supply Co., 1319 Wabansia Ave., Chicago 90.

Ward Steel Co., 44 Farnworth St., Boston 10.

Wetherell Bros. Co., 251 Albany St., Cambridge A, Mass.

Bars, Cold Rolled Steel

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13.

Baron Steel Co., 4075 Detroit Ave., Toledo 12.

Beals, McCarthy & Rogers, Inc., 50 Terrace, Buffalo 5, N. Y.

Bethlehem Steel Co., Bethlehem, Pa.

Brown-Wales Co., 493 C St., Boston 10.

Central Steel & Wire Co., 3000 W. 51st St., Chicago 32.

Columbia Steel Co., Russ Bldg., San Francisco 6.

Columbia Steel & Shafting Co., P. O. Box 1557, Pittsburgh 30.

Frasse & Co., Inc., Peter A., 17 Grand St., at 6th Ave., New York 13.

Glazer Steel Corp., 2103 Ailor Ave., Knoxville, Tenn.

Griffin Manufacturing Co., Erie, Pa.

Holliday & Co., W. J., Polk Blvd. & Wabash Ave., Hammond, Ind.

Indianapolis Machy. & Sup. Co. (Distributors), 1959-69 S. Meridian St., Indianapolis 6.

Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Third Ave. & Ross St., Pittsburgh 30.

Jorgenson Co., Earle M., Box 2358, Terminal Annex, Los Angeles 54.

Peterson Steels, Inc., 420 Lexington Ave., New York 17.

WHO SELLS IT?

Southern Rail & Equipment Co., 1220 Riverside Dr., Knoxville 4, Tenn.

Steel Sales Corp., 3352 S. Pulaski Rd., Chicago 23.

Timken Roller Bearing Co., Canton 6, Ohio.

United States Steel Supply Co., 1319 Wabansia Ave., Chicago 90.

Wetherell Bros. Co., 251 Albany St., Cambridge A, Mass.

Bars, Free Machining Steel

Ajax Steel & Forge Co., 205 Adair St., Detroit 7.

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13.

Baron Steel Co., 4075 Detroit Ave., Toledo 12.

Bethlehem Steel Co., Bethlehem, Pa.

Brown-Wales Co., 493 C St., Boston 10.

Carpenter Steel Co., 321 W. Bern St., Reading, Pa.

Central Steel & Wire Co., 3000 W. 51st St., Chicago 32.

Columbia Steel Co., Russ Bldg., San Francisco 6.

Columbia Steel & Shafting Co., P. O. Box 1557, Pittsburgh 30.

Frasse & Co., Inc., Peter A., 17 Grand St. at 6th Ave., New York 13.

Glazer Steel Corp., 2103 Ailor Ave., Knoxville, Tenn.

Holliday & Co., W. J., Polk Blvd. & Wabash Ave., Hammond, Ind.

Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Third Ave. & Ross St., Pittsburgh 30.

Jorgenson Co., Earle M., Box 2358, Terminal Annex, Los Angeles 54.

Monarch Steel Co., 543 W. McCarty St., Indianapolis 7.

Timken Roller Bearing Co., Canton 6, Ohio.

United States Steel Supply Co., 1319 Wabansia Ave., Chicago 90.

Bars, Indium

The Indium Corp. of America, 60 E. 42nd St., New York 17.

Bars, Magnesium Alloy

American Magnesium Corp., Gulf Bldg., Pittsburgh.

Revere Copper and Brass Inc., 230 Park Ave., New York 17.

Steel Sales Corp., 3352 S. Pulaski Rd., Chicago 23.

Timken Roller Bearing Co., Canton 6, Ohio.

Bars, Nickel and Nickel Alloys

Carnegie-Illinois Steel Corp., Carnegie Bldg., Pittsburgh.

Driver-Harris Co., Harrison, N. J.

International Nickel Co. Inc., 67 Wall St., New York 5.

Rotary Electric Steel Co., Ferndale Station, Box 90, Detroit.

Bars, Reinforcing

Atlantic Steel Co., Atlanta, Ga.

Bethlehem Steel Co., Bethlehem, Pa.

Carnegie-Illinois Steel Corp., Carnegie Bldg., Pittsburgh.

Columbia Steel Co., Russ Bldg., San Francisco.

Connors Steel Co., Stallings Ave., Birmingham.

Inland Steel Co., 38 S. Dearborn St., Chicago 3.

Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30.

WHO SELLS IT?

Sweet Steel Co., Williamsport 62, Pa.

Tennessee Coal, Iron & Railroad Co., 20th St., Birmingham.

Bars, Stainless Steel

Ajax Steel & Forge Co., 205 Adair St., Detroit 7.

Allegheny Ludlum Steel Corp., Brackenridge, Pa.

American Rolling Mill Company, 303 Armco Avenue, Middletown, Ohio.

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13.

Baron Steel Co., 4075 Detroit Ave., Toledo 12.

Brown-Wales Co., 493 C St., Boston 10.

Bethlehem Steel Co., Bethlehem, Pa.

Carnegie-Illinois Steel Corp., Carnegie Bldg., 434 5th Ave., Pittsburgh 30.

Carpenter Steel Co., 321 W. Bern St., Reading, Pa.

Central Steel & Wire Co., 3000 W. 51st St., Chicago 32.

Cleveland Tool & Supply Co., 1427 W. 6th St., Cleveland 13.

Columbia Steel Co., Russ Bldg., San Francisco 6.

Disston & Sons, Inc., Henry, 4619 Tacony, Tacony, Philadelphia 35.

Frasse & Co., Inc., Peter A., 17 Grand St., at 6th Ave., New York 13.

Glazer Steel Corp., 2103 Ailor Ave., Knoxville, Tenn.

Heppenstall Co., Hatfield St., Pittsburgh 1.

Hoyland Steel Co. Inc., 405 Lexington Ave., New York 17.

Jessop Steel Co., Washington, Pa.

Jorgenson Co., Earle M., Box 2358, Terminal Annex, Los Angeles 54.

Republic Steel Corp., Massillon, Ohio.

Rustless Iron & Steel Div., The American Rolling Mill Co., 3400 E. Chase St., Baltimore 13.

Southern Rail & Equipment Co., 1220 Riverside Dr., Knoxville 4, Tenn.

Steel Sales Corp., 3352 S. Pulaski Rd., Chicago 23.

Timken Roller Bearing Co., Canton 6, Ohio.

Uddeholm Company of America, Inc., 155 East 44th Street, New York 17.

United States Steel Supply Co., 1319 Wabansia Ave., Chicago 90.

Wetherell Bros. Co., 251 Albany St., Cambridge A, Mass.

Baskets, Wiremesh

Cyclone Fence Div., American Steel & Wire Co., Waukegan, Ill.

Batteries, Storage

Thomas A. Edison, Inc., West Orange, N. J.

The Electric Auto-Lite Co., Toledo 1, Ohio.

Electric Storage Battery Co., 1950 Allegheny Ave., Philadelphia 32.

Gould Storage Battery Corp., Depew, N. Y.

National Battery Company, St. Paul 1.

Philco Corp., Storage Battery Div., 467 Calhoun St., Trenton 7, N. J.

Battery Chargers

Benwood-Linze Co., 1811-19 Locust St., St. Louis 3.

(TO BE CONTINUED)

84 Million Tons Steel Produced During 1947 Is Peacetime Record

o o o

By WALTER S. TOWER
President, A.I.S.I.

o o o

New York

• • • **In 1947** the industrial economy of the United States was strengthened by the production of more than 84 million tons of steel, a tonnage greater than ever made before in a peacetime year.

Walter S. Tower

That is a conspicuous achievement. Its full significance can best be judged by the American public in the reports of record and near-record production now being proclaimed by other industries. Without that huge tonnage of steel, the accelerated operations of the other industries could not have been attained.

Steel production in 1948 should equal or exceed the output of 1947, assuming that existing and additional steel capacity can be operated without interruptions from work stoppages or strikes and without shortages of raw materials of the proper quality. Domestic and foreign demands is expected to remain heavy.

In 1948, steel companies will have the benefit of some of the new producing facilities which have been under construction for a year or more as a part of steel's $1 billion expansion program, undertaken in accordance with the companies' long-established policy of meeting whatever demand exists for their products.

Golden Anniversary Model

Detroit

• • • **Oldsmobile** will celebrate its Golden Anniversary in February by introducing a new postwar model in the "98" series. Known as the "Futuramic," the new model will be of advanced design. It is reported to have a lower and wider body, increased window area and increased hp.

Geneva Convention Gave Maximum Cuts On U. S. Tariff Levels

Washington

• • • **The complete listing** of the tariff rates under the new international agreement, started on page 115 of the Dec. 18, 1947, issue of THE IRON AGE, and continued in last week's issue, is further continued here. The listing will be completed in coming issues.

Tariff Act 1930; par. No.	Description—Rate
335	Grit, shot, and sand or iron or steel, in any form: *Old rate ⅝¢ lb; new rate ⅝¢ lb.*
337	Card clothing not actually and permanently fitted to and attached to carding machines or to parts thereof at the time of importation: When manufactured with round iron or untempered round steel wire: *Old rate 15 pct ad valorem; new rate 10 pct ad valorem.* When manufactured with tempered round steel wire, or with plated wire, or other than round iron or steel wire, or with felt face, wool face, or rubber-face cloth containing wool: *Old rate 35 pct ad valorem; new rate 25 pct ad valorem.*
338	Screws, commonly called wood screws, of iron or steel: *Old rate 25 pct ad valorem; new rate 15 pct ad valorem.*
339	Table, household, kitchen, and hospital utensils, and hollow or flat ware, not specially provided for (except articles composed wholly or in chief value of tin or tin plate, electric flatirons, fly swatters, illuminating articles, and household food grinding or cutting utensils other than meat and food choppers, whether or not containing electrical heating elements as constituent parts thereof: Plated with gold but not plated in any part with platinum: *Old rate 65 pct ad valorem; new rate 32½ pct ad valorem.* Plated with silver but not plated in any part with platinum: On nickel silver or copper: *Old rate 35 pct ad valorem; new rate 25 pct ad valorem.* On other metal: *Old rate 50 pct ad valorem; new rate 35 pct ad valorem.* Composed of iron or steel and enameled or glazed with vitreous glasses (except sanitary articles) not containing electrical heating elements: *Old rate 5¢ lb and 15 pct ad valorem; new rate 2½¢ lb and 7½ pct ad valorem.* Composed wholly or in chief value of aluminum: *Old rate 8½¢ lb and 40 pct ad valorem; new rate 4¼¢ lb and 20 pct ad valorem.* Not plated with platinum, gold or silver, and not specially provided for: Carbonated water siphons composed wholly or in chief value of copper, brass, steel, or other base metal (other than aluminum):

Tariff Act 1930; par. No.	Description—Rate

Old rate 25 pct ad valorem; new rate 25 pct ad valorem.

Other:

Composed wholly or in chief value of brass:

Old rate 30 pct ad valorem; new rate 25 pct ad valorem.

Composed wholly or in chief value of pewter:
Old rate 25 pct ad valorem; new rate 12½ pct ad valorem.
Composed wholly or in chief value of iron, steel, copper, or antimony:
Old rate 40 pct ad valorem; new rate 20 pct ad valorem.
Composed wholly or in chief value of base metal other than aluminum, brass, pewter, iron, steel, copper, and antimony, if containing electrical heating elements:
Old rate 40 pct ad valorem; new rate 20 pct ad valorem.

341 Steel plates, stereotype plates, electrotype plates, half-tone plates, photogravure plates, photo-engraved plates, and plates of other materials, engraved or otherwise prepared for printing, and plates of iron or steel engraved or fashioned for use in the production of designs, patterns, or impressions on glass in the process of manufacturing plate or other glass; lithographic plates of stone or other material engraved, drawn, or prepared:
Old rate 25 pct ad valorem; new rate 15 pct ad valorem.

343 Needles for sewing, shoe, or embroidery machines of every description, not specially provided for:
Old rate $1.15 per 1000 and 40 pct ad valorem; new rate 75¢ per 1000 and 20 pct ad valorem.

343 Crochet needles or hooks:
Old rate $1.15 per 1000 and 40 pct ad valorem; new rate $1.15 per 1000 and 40 pct ad valorem.

343 Tape, knitting, and all other needles, not specially provided for, and bodkins of metal:
Old rate 30 pct ad valorem; new rate 30 pct ad valorem.

343 Needle cases or needle books furnished with assortments of needles only and valued at not less than $1.25 per dozen cases or books:
Old rate 30 pct ad valorem; new rate 30 pct ad valorem.

345 Saddlery and harness hardware: buckles, rings, snaps, bits, swivels, and all other articles of iron, steel, brass, composition, or other metal, commonly or commercially known as harness hardware; and all articles of iron, steel, brass, composition, or other metal, commonly or commercially known as saddlery or riding bridle hardware; all the foregoing:
If not plated with gold or silver:
Old rate 20 or 25 pct ad valorem; new rate 12½ pct ad valorem.
If plated with gold or silver:
Old rate 30 pct ad valorem; new rate 15 pct ad valorem.

(To be continued)

European Letter

(CONTINUED FROM PAGE 254)

and Labor parties in England, and of "men of goodwill" everywhere, have been and still are very puzzled and confused.

The muddle-mindedness can be seen at its best on the subject of prices. It is very widely believed that rising prices and inflation are one and the same thing. But they are not. It is true that they are associated together, like scarlet fever and rising temperatures. But so far from being the same thing, the one is nature's cure for the other. Inflation is an excess of demand over supply, and one way in which the two can be brought into balance is by such a rise of prices that the available supply absorbs the demand.

It is true that something of a vicious spiral is set up, the increased prices creating some new demand. But even with strong trade unions, it is a spiral that eventually slows down to a stop. Nobody in his senses would advocate an indefinite rise in prices as an end in itself. But it does at least bring the inflation to an end, whereas holding all prices down merely guarantees that it, and its harmful distortions, shall go on for ever.

There is another muddle about the effect that any attempt to get rid of inflation would have on the standard of living of the people. Sir Stafford Cripps, who can usually think straight, lent himself to this muddle when he said he would prefer to protect stomachs rather than purses. The object of any disinflationary policy—let it be admitted with all candor—is to reduce the money incomes, or at least the money expenditures, of the people. "The people" means all the people, and if the emphasis in this country is on the money incomes and expenditures of the wage-earners, it is only because they now engross so very large a proportion of the whole (after tax), and because their incomes are, by and large, the only ones which have risen in real value.

But to say that the object is to reduce money incomes is not to say that it is to reduce the standard of living. What is consumed at present depends on how much stuff there is to consume, and an effective disinflationary policy, by getting rid of some of the present choking

distortions, would actually increase the amount of stuff to be consumed. There might indeed be less tobacco and beer consumed, there might be fewer gigantic crowds at football matches, carried there by motor coaches using imported petrol, there might be less squandering of money on trash. But would these reductions really be against the interest either of the country at large or of the working class? A disinflationary policy, sufficient to bring demand into relation with supply, would not deprive the wage-earners of anything that does them any good. It is really the purse after all, and not the stomach, that Sir Stafford is protecting.

A THIRD muddle overhangs the rate of interest. What prices are to the flow of expenditure on consumption, the rate of interest is to the flow of expenditure on capital. The recent White Paper on the capital cuts showed that it is just as difficult to reduce the volume of capital outlay by measures of control and allocation as it is to reduce the total volume of consumption expenditure by rationing and controls. Yet a rise in the rate of interest is another of the sacred taboos, which only black-hearted reactionaries dare mention. It is the fashion to say that it would have little effect in cutting capital expenditures—but past experience is to the contrary.

Mr. Stalin, when he sees what harm inflation is doing to his country, can take effective action against it. So can Signor Einaudi. The Americans, in their different way, can take what may perhaps be called effective inaction, for the sequel will certainly show that, by letting things rip, they will bring demand down into equilibrium with supply—indeed, probably far below it. But we poor British seem to be stretched so tight between a number of contradictory rigidities that we cannot move. Incomes must not be touched—there must be no "mucking about with the workers' pennies," irrespective of what they buy. Prices must not go up. And the rate of interest must be kept down. Any one by itself would be possible; the three in combination simply do not make sense. The economy is being pulled to pieces, and the government's various programs, as they follow in rapid succession,

are merely pasting white papers over the cracks.

NOT for the first time, the Left of the western democracies—and the Right too, for that matter—may well be exhorted to pay less attention to the theory of communism and more to the practice of Stalinism. Only in Russia and in America have there been really effective economic policies in recent years. And underneath all the ideological nonsense, underneath all the very real political and social differences, the two economies are strikingly similar. Stakhanovism, industrial purges, the 5-Year Plan and the devaluation of the ruble—what are those but somewhat stiff and overformalized versions of the great capitalist virtues—a system of incentives to enterprise, of rewards for success and of sanctions for inefficiency, a first lien on the national income for productive capital investment, and the maintenance of sound money.

These principles work, both in America and apparently in Russia, and the fact suggests that what makes an economic system effective is not whether it is planned or free, or half and half, but whether it is based on a realistic appreciation of the basic truths about the springs of human action and the origins of material wealth. The British people may wish to erect a superstructure different from either the Russian or the American. There is no reason why they should not do so. But they will not make much progress if they try to disregard these basic principles, if they build on humbug and substitute sentimentalities for realities. And their system will not work if they allow the place of economic policy to be usurped by the mere recital of mutually contradictory taboos.

Republic Installs Blower

Buffalo

• • • **Republic Steel** Corp. is installing a $1,000,000 high-pressure blower system in its 900-ton blast furnace at the Buffalo plant, which is expected to increase production of the unit by about 20 pct. Manager Frank C. Farrell said completion is scheduled by March and, if the blower comes up to expectations, a similar turbine system will be installed in the company's other blast furnace here, a 750-ton unit.